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INTERACTION BETWEEN U.S. TAX POLICY AND DOMESTIC RESEARCH AND DEVELOPMENT

HEARING

BEFORE THE

SUBCOMMITTEE ON
TAXATION AND DEBT MANAGEMENT

OF THE

COMMITTEE ON FINANCE
UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

FIRST SESSION

ON

S. 58 and S. 716

APRIL 3, 1987

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INTERACTION BETWEEN U.S. TAX POLICY AND DOMESTIC RESEARCH AND DEVELOPMENT

FRIDAY, APRIL 3, 1987

U.S. SENATE,
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT,
COMMITTEE ON FINANCE,
Washington, DC.

The committee was convened, pursuant to notice, at 9:35 a.m., in room SD-215, Dirksen Senate Office Building, the Honorable Max Baucus (chairman) presiding.

Present: Senators Baucus, Danforth, Chafee, and Wallop.

[The press release announcing the hearing and a description of S. 58 and S. 716 by the Joint Committee on Taxation follow:]

[Press Release, Mar. 3, 1987]

FINANCE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT ANNOUNCES HEARING ON THE RESEARCH AND DEVELOPMENT CREDIT

WASHINGTON, D.C.—Senator Max Baucus (D., Montana), Chairman of the Subcommittee on Taxation and Debt Management, announced today that the Subcommittee will hold a hearing on April 3, 1987 to review the interaction between U.S. tax policy and domestic research and development.

In particular, the hearing will focus on S. 58, which would reauthorize the modify the R&D tax credit, and on proposals regarding the allocation of domestic research expenses.

"Research is the lifeblood of economic progress, Senator Baucus said. "To maintain our international competitiveness, our tax system must promote the optimal amount of research and must not create disincentives that encourage companies to shift research overseas."

"This hearing gives us an opportunity to review the relationship between U.S. tax policy and domestic research and development," he said. "We are particularly interested in reviewing the operation of two research-related provisions that expire shortly: the R&D credit and the allocation rule for domestic research expenses under section 861 of the Internal Revenue Code."

The hearing will begin at 9:30 a.m. on Friday, April 3, 1987, Room SD-215 of the Dirksen Senate Office Building.

DESCRIPTION OF PROPOSALS RELATING TO RESEARCH AND DEVELOPMENT INCENTIVE ACT OF 1987 (S. 58) AND ALLOCATION OF R&D EXPENSES TO U.S. AND FOREIGN INCOME (S. 716)

Prepared by the Staff
of the
JOINT COMMITTEE ON TAXATION

INTRODUCTION

The Senate Finance Subcommittee on Taxation and Debt Management has scheduled a public hearing on April 3, 1987, on proposals relating to the credit for increasing certain research expenditures (S. 58, sponsored by Senators Danforth, Baucus, Wallop, Boren, Durenberger, Mitchell, Wilson, DeConcini, Kerry, Cranston, Bingaman, Riegle, Symms, Cochran, Heflin, Lautenberg, Rockefeller, McCain, Helms, and Harkin), and allocation of R&D expenses to U.S. and foreign income (S. 716, sponsored by Senators Wallop, Baucus, Danforth, Moynihan, Chafee, Roth, Boren, Pryor, Heinz, Durenberger, Armstrong, Riegle, Rockefeller, Symms, Lautenberg, and McCain).

This pamphlet,[1] prepared by the staff of the Joint Committee on Taxation, provides a description of present law and S. 58 and S. 716. The first part is a summary. The second part is a description of present law, issues, and S. 58 (relating to the tax credit for increasing certain research expenditures). The third part is a description of present law, issues, and S. 716 (relating to allocation of R&D expenses to U.S. and foreign income).

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[1] This pamphlet may be cited as follows: Joint Committee on Taxation, *Description of Proposals Relating to Research and Development Incentive Act of 1987 (S. 58) and Allocation of R&D Expenses to U.S. and Foreign Income (S. 716)* (JCS-6-87), April 2, 1987.

I. SUMMARY

S. 58—Senators Danforth, Baucus, Wallop, Boren, Durenberger Mitchell, Wilson, DeConcini, Kerry, Cranston, Bingaman, Riegle, Symms, Cochran, Heflin, Lautenberg, Rockefeller, McCain, Helms, and Harkin

(The Research and Development Incentive Act of 1987)

Present law provides a tax credit equal to 20 percent of incremental qualified research expenditures of the taxpayer. The credit is scheduled to expire after December 31, 1988.

S. 58 would increase the research tax credit from 20 percent to 25 percent, effective for taxable years beginning after December 31, 1986. The bill also would make the credit permanent.

S. 716—Senators Wallop, Baucus, Danforth, Moynihan, Chafee, Roth, Boren, Pryor, Heinz, Durenberger, Armstrong, Riegle, Rockefeller, Symms, Lautenberg, and McCain

(Allocation of R&D Expenses to U.S. and Foreign Income)

For taxable years beginning after August 1, 1986, present law and Treasury regulations provide detailed rules for the allocation of research and development (R&D) expenses to U.S. and foreign income. For taxable years beginning after August 13, 1981, and on or before August 1, 1986, all expenses of performing R&D in the United States are allocated to U.S. income. S. 716 would similarly allocate to U.S. income all the expenses of performing R&D in the United States for taxable years beginning after August 1, 1986.

R&D allocation rules are relevant to the determination of the amount of the foreign tax credit for some U.S. taxpayers. The United States taxes the worldwide income of U.S. taxpayers but permits them to credit foreign income taxes against U.S. tax imposed on foreign-source taxable income.

Foreign-source and U.S.-source taxable income are computed by first determining the sources of items of gross income and then determining which deductions reduce income from which source. Deductions allocated to foreign-source gross income reduce foreign-source taxable income. A taxpayer whose foreign-source income is free of U.S. tax by virtue of foreign tax credits generally does not benefit from deductions that offset foreign-source income. Thus, it can be advantageous to taxpayers that pay relatively high foreign taxes to minimize allocation of expenses to foreign income.

II. CREDIT FOR INCREASING RESEARCH EXPENDITURES

Present Law

Current Deduction for Certain Research Expenditures

General rule

As a general rule, business expenditures to develop or create an asset which has a useful life that extends beyond the taxable year, such as expenditures to develop a new product or improve a production process, must be capitalized. However, Code section 174 permits a taxpayer to elect to deduct currently the amount of "research or experimental expenditures" incurred in connection with the taxpayer's trade or business. For example, a taxpayer may elect to deduct currently the costs of wages paid for services performed in qualifying research activities, and of supplies and materials used in such activities, even though these research costs otherwise would have to be capitalized.

The section 174 election does not apply to expenditures for the acquisition or improvement of depreciable property, or land, to be used in connection with research.[2] Thus, for example, the total cost of a research building or of equipment used for research cannot be deducted currently under section 174 in the year of acquisition. However, the amount of depreciation (cost recovery) allowance for a year with respect to depreciable property used for research may be deducted in that year under sections 167 and 168. Under the Tax Reform Act of 1986 (P.L. 99-514), machinery and equipment used in connection with research and experimentation are classified as five-year recovery property.

Qualifying expenditures

The Code does not specifically define "research or experimental expenditures" eligible for the section 174 deduction election, except to exclude certain costs. Treasury regulations (sec. 1.174-2(a)) define this term to mean "research and development costs in the experimental or laboratory sense." This includes generally "all such costs incident to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property," and also the costs of obtaining a patent on such property.

The present regulations provide that qualifying research expenditures do not include expenditures "such as those for the ordinary testing or inspection of materials or products for quality control or those for efficiency surveys, management studies, consumer surveys, advertising, or promotions." The section 174 election cannot be applied to costs of acquiring another person's patent, model, production, or process or to research expenditures incurred in connection with literary, historical, or similar projects (Reg. sec. 1.174-2(a)).

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[2] The statute also excludes expenditures to ascertain the existence, location, extent, or quality of mineral deposits, including oil and gas, from eligibility for section 174 elections (sec. 174(d)). However, expenses of developing new and innovative methods of extracting minerals from the ground may be eligible for sec. 174 elections (Rev. Rul. 74-67, 1974-1 C.B. 63). Certain expenses for development of a mine or other natural deposit (other than an oil or gas well) may be deductible under sec. 616.

Minimum tax rules

For purposes of the individual alternative minimum tax, the excess of research expenditures that are expensed under section 174 over 10-year amortization is a preference item. The 1986 Act repealed a prior-law provision making the excess of section 174 expensing over 10-year amortization a preference item for personal holding companies. Thus, for all corporations, expensing under section 174 does not give rise to a minimum tax preference item under present law.

Credit for Increasing Certain Research Expenditures

Overview

General rule.—An income tax credit is allowed for certain qualified research expenditures paid or incurred by a taxpayer during the taxable year in carrying on a trade or business of the taxpayer.[3] The credit applies only to the extent that the taxpayer's qualified research expenditures for the taxable year exceed the average amount of the taxpayer's yearly qualified research expenditures in the specified base period, which generally is the preceding three taxable years.

Under the Tax Reform Act of 1986, the rate of the credit was reduced from 25 percent to 20 percent of the incremental research expenditure amount, effective for taxable years beginning after 1985. The 1986 Act also extended the credit for three years, i.e., to qualified research expenditures paid or incurred after June 30, 1981 and before January 1, 1989.

Research definition.—The Tax Reform Act of 1986 provided statutory rules defining qualified research for purposes of the credit. These rules target the credit to research undertaken to discover information that is technological in nature and that pertains to functional aspects of products; also, the 1986 Act expressly excludes certain types of expenditures from eligibility for the credit.[4]

Qualifying expenditures.—A taxpayer's research expenditures eligible for the 20-percent incremental credit consist of (1) "in-house" expenditures by the taxpayer for research wages and supplies used in research; (2) certain time-sharing costs for computer use in research; and (3) 65 percent of amounts paid by the taxpayer for contract research conducted on the taxpayer's behalf.

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[3] The credit was enacted as section 44F in the Economic Recovery Tax Act of 1981. The Deficit Reduction Act of 1984 renumbered the credit provision as Code section 30. The Tax Reform Act of 1986 renumbered this credit as section 41.

[4] In computing the research credit for taxable years beginning after December 31, 1985, base-period expenditures for taxable years beginning before January 1, 1986, are to be determined under the credit definition of qualified research that was applicable in such base-period years and are not to be redetermined under the definition of qualified research in the 1986 Act.

Under the 1986 Act, a 20-percent tax credit also applies to the *excess* of (1) 100 percent of corporate cash expenditures (including grants or contributions) paid for university basic research *over* (2) the sum of (a) the greater of two fixed research floors plus (b) an amount reflecting any decrease in nonresearch giving to universities by the corporation as compared to such giving during a fixed base period, as adjusted for inflation.

The amount of credit-eligible basic research expenditures to which the new university basic research credit applies does not enter into the computation of the incremental credit.[5] The remaining amount of credit-eligible basic research expenditures—i.e., the amount to which the new credit does not apply—enters into the incremental credit computation (and in subsequent years enters into the base period amounts for purposes of computing the incremental credit).

Relation to deduction.—The credit is available for incremental qualified research expenditures for the taxable year whether or not the taxpayer has elected under section 174 to deduct currently research expenditures. The amount of any section 174 deduction to which the taxpayer is entitled is not reduced by the amount of any credit allowed for qualified research expenditures.

Definition of research for credit purposes

In general

The credit is directed at research undertaken for the purpose of discovering information that is technological in nature and when applied is intended to be useful in developing a new or improved business component for sale or use in the taxpayer's trade or business. In addition, research is eligible for the credit only where substantially all the activities of the research constitute elements of a process of experimentation relating to functional aspects of the business component. The Code provides exclusions from the credit for certain research or research-related activities. The costs of developing certain internal-use software are available for the credit only if specified requirements are met.

Research

Research expenditures eligible for the incremental credit are limited to "research or experimental expenditures" eligible for expensing under section 174 (see discussion above). Thus, for example, the credit is not available for (1) expenditures other than "research and development costs in the experimental or laboratory sense," (2) expenditures "such as those for the ordinary testing or inspection of materials or products for quality control or those for efficiency surveys, management studies, consumer surveys, advertising, or promotions," (3) costs of acquiring another person's patent, model, production, or process, or (4) research expenditures incurred in connection with literary, historical, or similar projects (Treas. Reg. sec. 1.174-2(a)).[6] The term research includes basic research.

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[5] The Code provides a single research credit, consisting of a 20-percent incremental component and a 20-percent university basic research component. For convenience, this explanation generally refers to these components as the incremental research credit and the university basic research credit.

Research satisfying the section 174 expensing definition is eligible for the credit only if the research is undertaken for the purpose of discovering information (a) that is technological in nature, and also (b) when applied is intended to be useful in the development of a new or improved business component of the taxpayer. In addition, such research is eligible for the credit only if substantially all of the activities of the research constitute elements of a process of experimentation for a functional purpose. The Code also expressly sets forth exclusions from eligibility for the credit for certain research activities that might otherwise qualify and for certain nonresearch activities.

Technological nature

The determination of whether the research is undertaken for the purpose of discovering information that is technological in nature depends on whether the process of experimentation utilized in the research fundamentally relies on principles of the physical or biological sciences, engineering, or computer science [7]—in which case the information is deemed technological in nature—or on other principles, such as those of economics—in which case the information is not to be treated as technological in nature. For example, information relating to financial services or similar products (such as new types of variable annuities or legal forms) or advertising does not qualify as technological in nature.

Process of experimentation

The term process of experimentation means a process involving the evaluation of more than one alternative designed to achieve a result where the means of achieving that result is uncertain at the start. This may involve developing one or more hypotheses, testing and analyzing those hypotheses (through, for example, modeling or simulation), and refining or discarding the hypotheses as part of a sequential design process to develop the overall component.

Thus, for example, costs of developing a new or improved business component are not eligible for the credit if the method of reaching the desired objective (the new or improved product characteristic) is readily discernible and applicable as of the beginning of the research activities, so that true experimentation in the scientific or laboratory sense would not have to be undertaken to develop, test, and choose among viable alternatives. On the other hand, costs of experiments undertaken by chemists or physicians in developing and testing a new drug are eligible for the credit because the researchers are engaged in scientific experimentation. Similarly, engineers who design a new computer system, or who design improved or new integrated circuits for use in computer or other electronic products, are engaged in qualified research because the design of those items is uncertain at the outset and can only be determined through a process of experimentation relating to specific design hypotheses and decisions as described above.

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[6] Sec. 174 also excludes from eligibility for expensing (1) expenditures for the acquisition or improvement of depreciable property, or land, to be used in connection with research, and (2) expenditures to ascertain the existence, location, extent, or quality of mineral deposits, including oil and gas.

[7] Research does not rely on the principles of computer science merely because a computer is employed. Research may be treated as undertaken to discover information that is technological in nature, however, if the research is intended to expand or refine existing principles of computer science.

Functional purposes

Research is treated as conducted for a functional purpose only if it relates to a new or improved function, performance, reliability, or quality. Activities undertaken to assure achievement of the intended function, performance, etc. of the business component after the beginning of commercial production of the component do not constitute qualified experimentation. The Code also provides that research relating to style, taste, cosmetic, or seasonal design factors is not treated as conducted for a functional purpose and hence is not eligible for the credit.

Application of tests

The term business component means a product, process, computer software, technique, formula, or invention that is to be held for sale, lease, or license, or is to be used by the taxpayer in a trade or business of a taxpayer. If the requirements described above are not met with respect to a product, etc. but are met with respect to one or more elements thereof, the term business component means the most significant set of elements of such product, etc. with respect to which all requirements are met.

Thus, the requirements are applied first at the level of the entire product, etc. to be offered for sale, etc. by the taxpayer. If all aspects of such requirements are not met at that level, the test applies at the most significant subset of elements of the product, etc. This shrinking back of the product is to continue until either a subset of elements of the product that satisfies the requirements is reached, or the most basic element of the product is reached and such element fails to satisfy the test. Treasury regulations may prescribe rules for applying these rules where a research activity relates to more than one business component.

A plant process, machinery, or technique for commercial production of a business component is treated as a different component than the product being produced. Thus, research relating to the development of a new or improved production process is not eligible for the credit unless the definition of qualified research is met separately with respect to such production process research, without taking into account research relating to the development of the product.

Internal-use computer software

Under a specific rule in the Code, research with respect to computer software that is developed by or for the benefit of the taxpayer primarily for the taxpayer's own internal use is eligible for the credit only if the software is used in (1) qualified research (other than the development of the internal-use software itself) undertaken by the taxpayer, or (2) a production process that meets the requirements for the credit (e.g., where the taxpayer is developing robotics and software for the robotics for use in a manufacturing process, and the taxpayer's research costs of developing the robotics are eligible for the credit). Any other research activities with respect to internal-use software are ineligible for the credit except to the extent provided in Treasury regulations. Accordingly, the costs of developing software are not eligible for the credit where the software is used internally, for example, in general and administrative functions (such as payroll, bookkeeping, or personnel management) or in providing noncomputer services (such as accounting, consulting, or banking services), except to the extent permitted by Treasury regulations.

The Congress intended and expected that these regulations will make the costs of new or improved internal-use software eligible for the credit only if the taxpayer can establish, in addition to satisfying the general requirements for credit eligibility, (1) that the software is innovative (as where the software results in a reduction in cost, or improvement in speed, that is substantial and economically significant); (2) that the software development involves significant economic risk (as where the taxpayer commits substantial resources to the development and also there is substantial uncertainty, because of technical risk, that such resources would be recovered within a reasonable period); and (3) that the software is not commercially available for use by the taxpayer (as where the software cannot be purchased, leased, or licensed and used for the intended purpose without modifications that would satisfy the first two requirements just stated). The Congress intended that these regulations are to apply as of the effective date of the new specific rule relating to internal-use software; i.e, internal-use computer software costs that qualify under the three-part test set forth in this paragraph are eligible for the research credit even if incurred prior to issuance of such final regulations.

The specific rule relating to internal-use computer software is not intended to apply to the development costs of a new or improved package of software and hardware developed together by the taxpayer as a single product, of which the software is an integral part, that is used directly by the taxpayer in providing technological services in its trade or business to customers. For example, the specific rule would not apply where a taxpayer develops together a new or improved high technology medical or industrial instrument containing software that processes and displays data received by the instrument, or where a telecommunications company develops a package of new or improved switching equipment plus software to operate the switches. In these cases, eligibility for the incremental research tax credit is to be determined by examining the combined hardware-software product as a single product, and thus the specific rule applicable to internal-use computer software would not apply to the combined hardware-software product.

In the case of computer software costs incurred in taxable years before the effective date for the new specific rule, the eligibility of such costs for the research credit is to be determined in the same manner as the eligibility of hardware product costs.

Excluded activities

The Code specifies that expenditures incurred in certain research, research-related, or nonresearch activities are excluded from eligibility for the credit, without reference to the requirements described above relating to technological information, process of experimentation, and functional purposes.

Post-research activities.—Activities with respect to a business component after the beginning of commercial production of the component cannot qualify as qualified research. Thus, no expenditures relating to a business component are eligible for the credit after the component has been developed to the point where it either meets the basic functional and economic requirements of the taxpayer for such component or is ready for commercial sale or use.[8] For example, the credit is not available for such expenditures as the costs of preproduction planning for a finished business component, tooling-up for production, trial production runs, troubleshooting involving detecting faults in production equipment or processes, accumulation of data relating to production processes, and the cost of debugging product flaws.

By way of further illustration, the credit is not available for costs of additional clinical testing of a pharmaceutical product after the product is made commercially available to the general public. However, the clinical testing in the United States of a product prior to production for sale in this country, or clinical testing seeking to establish new functional uses, characteristics, indications, combinations, dosages, or delivery forms as improvements to an existing product, is eligible for the credit. Thus, research (e.g., body chemistry research) undertaken on a product approved for one specified indication to determine its effectiveness and safety for other potential indications is eligible for the credit. Similarly, testing a drug currently used to treat hypertension for a new anti-cancer application, and testing an antibiotic in combination with a steroid to determine its therapeutic value as a potential new anti-inflammatory drug, is eligible for the credit.

Adaptation.—Adaptation of an existing business component to a particular requirement or customer's need is not eligible for the credit. Thus, for example, the costs of modifying an existing computer software item for a particular customer are not eligible for the credit. However, the mere fact that an item is intended for a specific customer does not disqualify otherwise qualified research costs of the item (assuming that the research is not funded by the customer).

Surveys, studies, certain other costs.—The credit is not available for the costs of efficiency surveys, activities (including studies) related to management functions or techniques, market research, market testing and development (including advertising or promotions), routine data collections, or routine or ordinary testing or inspection of materials or business items for quality control. Management functions and techniques include such items as preparation of financial data and analysis, development of employee training programs and management organization plans, and management-based changes in production processes (such as rearranging work stations on an assembly line).

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[8] The exclusion from credit-eligibility for activities with respect to a business component after the beginning of commercial production of the component does not preclude the costs of improvements in an existing product from eligibility for the credit. Thus, for example, the expenses of an automobile manufacturer in developing, through a process of experimentation, a more efficient and reliable diesel fuel injector are eligible for the incremental research tax credit even though the research expenses are incurred during or after production by the manufacturer of automobile engines containing the existing (unimproved) diesel fuel injector. However, the costs of any activities of the automobile manufacturer with respect to the improved diesel fuel injector after the beginning of commercial production of the improved diesel fuel injector are not eligible for the research credit.

Duplication.—The credit also does not apply to research related to the reproduction of an existing business component (in whole or in part) of another person from a physical examination of the component itself or from plans, blueprints, detailed specifications, or publicly available information with respect to such component. While such "reverse engineering" activities thus are not eligible for the credit, the exclusion for duplication does not apply merely because the taxpayer examines a competitor's product in developing its own component through a process of otherwise qualified experimentation requiring the testing of viable alternatives and based on the knowledge gained from such tests.

Additional exclusions.—Eligibility for the credit does not extend to expenditures for research (1) that is conducted outside the United States; (2) in the social sciences (including economics, business management, and behavioral sciences), arts, or humanities; or (3) to the extent funded by any person (or governmental entity) other than the taxpayer, whether by grant, contract, or otherwise.

Eligibility of certain computer-use payments

The Tax Reform Act of 1986 generally repealed the prior-law provision treating amounts paid for the right to use personal property in qualified research as eligible for the credit. However, under regulations prescribed by the Treasury, amounts paid by the taxpayer to another person for the use of computer time in the conduct of qualified research are eligible for the credit. The latter provision is intended to benefit smaller businesses that cannot afford to purchase or lease their own computers for research purposes, and hence is intended to apply where the taxpayer is not the principal user of the computer. Consistent with the prior-law limitations on credit-eligibility of rental costs, computer-use payments are not eligible for the credit to the extent that the taxpayer (or a person with which the taxpayer must aggregate expenditures in computing the credit) receives or accrues any amount from any other person for computer use.

In computing the research credit for a taxable year beginning after 1985 (when rental costs are not eligible for the credit), a taxpayer may exclude from the base-period amount with respect to such year any rental costs, etc. (other than for computer-use costs of a type remaining eligible for the credit in post-1985 years) that were allowable as qualified research expenses under section 30(b)(2)(A)(iii) (as then in effect) in a base-period year.

In-house research expenditures

Employee wages qualify for the credit to the extent paid for engaging in the actual conduct of research, in the immediate supervision of the actual conduct of qualified research, or in the direct support of the actual conduct (or of the immediate supervision of the actual conduct) of qualified research. No amount of wages paid for overhead or for general and administrative services, or of indirect research wages, qualifies for the credit.

In addition, amounts paid for supplies used in the conduct of qualified research are eligible for the credit. The term supplies means any tangible property other than property of a character subject to the allowance for depreciation, land, or improvements to land. Neither the cost of acquisition of, nor the amount of depreciation allowances with respect to, property which is of a character subject to the depreciation allowance is eligible for the credit, whether or not amounts of depreciation are deductible during the year under section 174.

Contract research expenditures

In addition to the categories of in-house research expenditures, 65 percent of amounts paid by the taxpayer for qualified research performed on behalf of the taxpayer enters into the incremental credit computation. The research firm or other person which conducts the research on behalf of the taxpayer cannot claim any amount of the credit for its expenditures in performing the contract.

If any contract research amount paid or incurred during a taxable year is attributable to qualified research to be conducted after the close of that taxable year, that amount is treated, pursuant to a prepayment limitation, as paid or incurred during the period during which the qualified research is actually conducted.

University basic research credit

In general

Prior to enactment of the Tax Reform Act of 1986, research expenditures entering into the computation of the incremental research credit included 65 percent of a corporation's expenditures (including grants or contributions) pursuant to a written research agreement for basic research to be performed by universities or certain scientific research organizations. The Act provides a 20-percent tax credit that applies to the *excess* of (1) 100 percent of corporate cash expenditures for university basic research over (2) the sum of (a) the greater of two fixed research floors plus (b) an amount reflecting any decrease in nonresearch giving to universities by the corporation as compared to such giving during a fixed base period, as adjusted for inflation.[9] The modifications relating to the university basic research credit are effective for taxable years beginning after 1986.

Qualifying expenditures

For purposes of the credit, qualifying basic research expenditures are cash expenditures paid pursuant to a written agreement between the taxpayer corporation [10] and a university or certain other qualified organizations for basic research to be performed by the qualified organization (or by universities receiving funds through the initial recipient qualified organizations). Such corporate expenditures for university basic research are deemed to satisfy the trade or business test for the research credit, whether or not the basic research is in the same field as an existing trade or business of the corporation.

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[9] The Code provides a single research credit, consisting of a 20-percent incremental component and a 20-percent university basic research component. For convenience, this explanation generally refers to these components as the incremental research credit and the university basic research credit.

[10] For this purpose, the term corporation does not include S corporations (sec. 1361(a)), personal holding companies (sec. 542), or service organizations (sec. 414(m)(3)).

Qualifying expenditures include both grants or contributions by the corporation that constitute charitable contributions under section 170, and also payments for contract research to be performed by the qualified organization on behalf of the corporation. Such expenditures are not eligible for a credit unless and until actually paid by the corporation to a qualified organization. Thus, an accrual basis corporation may not claim the credit for amounts incurred, but not actually paid, for university basic research.

Only cash payments may qualify as a basic research payment. No amount (basis or value) on account of contributions or transfers of property is eligible for either the incremental credit or the basic research credit, whether or not such property constitutes scientific equipment eligible for an augmented charitable deduction under section 170(e)(4).

Since enactment of the credit in 1981, the term basic research has been defined in the Code as any original investigation for the advancement of scientific knowledge not having a specific commercial objective. However, basic research in the social sciences, arts, or humanities and basic research conducted outside the United States are excluded from eligibility for the credit.

Qualified organizations

To be eligible for a credit, the corporate expenditures must be for basic research to be conducted by a qualified organization. For this purpose, the term qualified organization generally includes colleges or universities, tax-exempt scientific research organizations, and certain tax-exempt conduit or grant organizations.

The first category of qualified organizations consists of educational institutions that both are described in section 170(b)(1)(A)(ii) and constitute institutions of higher education within the meaning of section 3304(f). The second category consists of tax-exempt organizations that (1) are organized and operated primarily to conduct scientific research, (2) are described in section 501(c)(3) (relating to exclusively charitable, educational, scientific, etc., organizations), and (3) are not private foundations. Certain tax-exempt grant funds continue to qualify under the second category.

In addition, this provision treats as qualified any tax-exempt organization that is organized and operated primarily to promote scientific research by colleges or universities pursuant to written research agreements, that expends on a current basis substantially all its funds (or all the basic research payments received by it) through grants and contracts for basic research by colleges and universities, and that is either (a) described in section 501(c)(3) and is not a private foundation or (b) described in section 501(c)(6) (trade associations).

Computation rules

The university basic research credit applies to the *excess* of (1) 100 percent of corporate cash expenditures for basic research *over* (2) the sum of the minimum basic research amount plus the maintenance-of-effort amount.

The minimum basic research amount is the *greater* of two fixed floors—

(a) the average of all credit-eligible basic research expenditures under Code section 30(e)(1) (as in effect during the base period) for each of the three taxable years immediately preceding the taxable year beginning after December 31, 1983; *or*

(b) one percent of the average of the sum of all in-house research expenses, contract research expenses, and credit-eligible basic research expenditures under Code section 30(e)(1) (as in effect during the base period) for each of the three taxable years immediately preceding the taxable year beginning after December 31, 1983.

In the case of a corporation that was not in existence for at least one full taxable year during the fixed base period, the Code provides that the minimum basic research amount for the base period shall not be less than 50 percent of the basic research payments for the current taxable year. If the corporation was in existence for one full taxable year or two full taxable years during the base period, the fixed floor is to be computed with respect to such year or years.

The maintenance-of-effort amount is the *excess* of (1) the average of the nondesignated university donations paid or incurred by the taxpayer during the three taxable years immediately preceding the taxable year beginning after December 31, 1983, as adjusted under the Act to reflect inflation, *over* (2) the amount of nondesignated university donations paid by the taxpayer in the taxable year. The term nondesignated university donation means all amounts paid by the taxpayer to all colleges or universities for which a charitable deduction was allowable and that were not taken into account in computing the research credit.

The amount of credit-eligible basic research expenditures to which the new credit applies does not enter into the computation of the incremental credit. The remaining amount of credit-eligible basic research expenditures—i.e., the amount to which the new credit does not apply—enters into the incremental credit computation (and in subsequent years enters into the base period amounts for purposes of computing the incremental credit).

Computation of allowable credit

General rule

As a general rule, the credit applies to the amount of qualified research expenditures for the current taxable year that exceeds the average of the yearly qualified research expenditures in the preceding three taxable years. The base period amount is not adjusted for inflation.

New businesses

For a base period year during which it was not in existence, a new business is treated as having research expenditures of zero in such year for purposes of computing average annual research expenditures during the base period. However, the taxpayer may be deemed to have expenditures in such a base period year pursuant to the 50-percent limitation rule (described below).

50-percent limitation rule

Base period research expenditures are treated as at least equal to 50 percent of qualified research expenditures for the current year. This 50-percent limitation applies both in the case of existing businesses and in the case of newly organized businesses.[11]

Aggregation rules

To ensure that the credit will be allowed only for actual increases in research expenditures, special rules apply under which research expenditures of the taxpayer are aggregated with research expenditures of certain related persons for purposes of computing any allowable credit. These rules are intended to prevent artificial increases in research expenditures by shifting expenditures among commonly controlled or otherwise related persons.

Changes in business ownership

Special rules apply for computing the credit where a business changes hands, under which qualified research expenditures for periods prior to the change of ownership generally are treated as transferred with the trade or business which gave rise to those expenditures. These rules are intended to facilitate an accurate computation of base period expenditures and the credit by attributing research expenditures to the appropriate taxpayer.

Trade or business limitations

The credit is available only for research expenditures paid or incurred in carrying on a trade or business of the taxpayer. With one exception relating to certain research joint ventures, the trade or business test for purposes of the credit is the same as for purposes of the business deduction provisions of section 162. Thus, for example, the credit generally is not available to a limited partnership (or to any partners in such partnership, including a general partner which is an operating company) for partnership expenditures for outside or contract research intended to be transferred by the partnership to another (such as to the general partner) in return for license or royalty payments. Under the trade or business test, research expenditures of a taxpayer are eligible for the credit only if paid or incurred in a particular trade or business already being carried on by the taxpayer.

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[11] For example, assume that a calendar-year taxpayer is organized on January 1, 1986; makes qualified research expenditures of $100,000 for 1986; and makes qualified research expenditures of $260,000 for 1987. The new-business rule provides that the taxpayer is deemed to have base period expenditures of zero for pre-1986 years. Without regard to the 50-percent limitation, the taxpayer's base period expenditures for purposes of determining any credit for 1987 would be the average of its expenditures for 1984 (deemed to be zero), 1985 (deemed to be zero), and 1986 ($100,000), or $33,333. However, by virtue of the 50-percent limitation, the taxpayer's average base period expenditures are deemed to be no less than 50 percent of its current year expenditures ($260,000), or $130,000. Accordingly, the amount of 1987 qualified research expenditures to which the credit applies is limited to $130,000, and the amount of the taxpayer's credit for 1987 is $26,000.

Other limitations and carryover

The 1986 Act made the research credit subject to the general business credit limitation (i.e., 75 percent of tax liability over $25,000), effective for taxable years beginning after 1985. Any excess amount of the general business credit can be carried back three years and carried forward 15 years, beginning with the earliest year.

In the case of an individual who owns an interest in an unincorporated trade or business, who is a beneficiary of a trust or estate, who is a partner in a partnership, or who is a shareholder in an S corporation, the amount of credit that can be used in a particular year also cannot exceed an amount (separately computed with respect to the person's interest in the trade or business or entity) equal to the amount of tax attributable to that portion of the person's taxable income which is allocable or apportionable to such interest.[12] Any excess credit amount is eligible for the carryover rule described above.

Legislative Proposal

S. 58—Senators Danforth, Baucus, Wallop, Boren, Durenberger, Mitchell, Wilson, DeConcini, Kerry, Cranston, Bingaman, Riegle, Symms, Cochran, Heflin, Lautenberg, Rockefeller, McCain, Helms and Harkin

(The Research and Development Incentive Act of 1987)

S. 58 would increase the research tax credit from 20 percent to 25 percent, effective for taxable years beginning after December 31, 1986. The bill also would make the credit permanent.

Issues

S. 58 raises the following issues with respect to improving the incentives for private investment in research and development activities:

(1) Whether to increase the tax credit to 25 percent?

(2) Whether to make the credit permanent?

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[12] For example, if in a particular year an individual partner derives no taxable income from a partnership which had made incremental qualified research expenditures, the individual may not use in that year any tax credit resulting from incremental qualified research expenditures of such partnership which otherwise would have been properly allowable to the partner (e.g., where the partnership had paid such research expenditures in carrying on a trade or business of the partnership and where any credit allowable to the partnership with respect to such expenditures had been properly allocated among the partners pursuant to Treasury regulations). If in this example the partner had derived taxable income allocable or apportionable to his or her partnership interest, then the amount of credit which may be used in that year by the individual partner may not exceed the lesser of the general limitation amount or the separately computed additional limitation amount applicable to individuals.

III. ALLOCATION OF R&D EXPENSES TO U.S. AND FOREIGN INCOME

Present Law

Jurisdiction to tax income

Countries generally claim the right to tax income for one of two reasons: (1) the income arises in the country, or (2) the person earning the income resides in that country (or owes allegiance to that country). Many countries take the view that the country where income arises, the source country, has the primary right to tax the income.[13] A few countries tax only income that arises within their borders. The United States taxes income that arises in the United States ("U.S.-source income" or "U.S. income"); the United States also taxes income of a U.S. person[14] that arises outside the United States ("foreign-source income" or "foreign income").[15]

Foreign tax credit

U.S. persons are taxable on their worldwide income, including their foreign income. That is, the taxable income reported on the U.S. tax return of a U.S. person includes both U.S. and foreign income. A U.S. person who earns foreign income may incur foreign income tax. The United States has allowed U.S. persons subject to the regular income tax to take full, dollar-for-dollar credit for foreign income taxes [16] since 1918. This credit directly reduces U.S. tax. Since 1921, however, foreign income taxes may reduce U.S. tax on foreign income, but not U.S. tax on U.S. income. Without this limitation (explained in more detail below), the foreign tax credit would permit foreign countries to preempt the taxing jurisdiction of the United States over its primary tax base—U.S. income.

The purpose of the foreign tax credit is to prevent U.S. taxpayers from paying tax twice on their foreign income—once to the foreign country where the income arises and again to the United States as part of the taxpayer's worldwide income. This foreign tax credit system embodies the principle that the country where a taxpayer conducts a business activity (or earns any income), the source country, has the first right to tax any or all of that income, even if it is not the taxpayer's home country. Under this principle, the taxpayer's home country (residence country) has a residual right to tax that income, but recognizes the obligation to prevent double taxation. That obligation may totally eliminate residence country tax.

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[13] However, some countries, including the United States, modify this rule by treaty with respect to certain passive income, and grant to the country in which the person earning income resides, the residence country, the primary right to tax such income.

[14] U.S. persons are U.S. citizens, resident aliens, U.S. partnerships, U.S. corporations, and, generally, U.S. trusts and estates (Code sec. 7701(a)(30)).

[15] Foreign earned income of a qualified U.S. individual may be exempt from U.S. income tax under Code section 911.

[16] Foreign income taxes include income, war profits, and excess profits taxes paid or accrued during the taxable year to any foreign country (or possession of the United States).

Some countries avoid double taxation by exempting foreign-source income from tax altogether. However, most developed countries, like the United States, minimize double taxation through a foreign tax credit system, providing a dollar-for-dollar credit against home country tax liability for income taxes paid to a foreign country. Either system, the exemption system or the foreign tax credit system, requires a determination of what income is domestic and what income is foreign.

Foreign tax credit limitation

The U.S. system of international income taxation generally is based in part on the principle of capital-export neutrality. Under this principle, a U.S. firm would ideally bear the same total tax burden whether it operated at home or abroad.

Another fundamental premise of the U.S. foreign tax credit system is that foreign taxes should not offset the U.S. tax on U.S.-source income. Accordingly, a statutory formula limits the foreign tax credit so that the credit will offset only the U.S. tax on the taxpayer's foreign income. As a result of the limitation, the U.S. tax system generally departs from capital-export neutrality where firms operate in foreign countries which levy an income tax greater than the U.S. tax on foreign-source income.

Without the foreign tax credit limitation, foreign countries could effectively levy a tax on U.S.-source income by raising their tax rates above the U.S. rate. Because of the credit, the U.S. Treasury would absorb the additional foreign tax burden. That is, post-credit U.S. taxes owed on U.S.-source income would be reduced.

The limitation generally operates by separating the taxpayer's total U.S. tax liability before tax credits ("pre-credit U.S. tax") into two categories: tax on U.S.-source taxable income and tax on foreign-source taxable income. (A series of separate limitations further subdivides the tax on different types of foreign-source income.) Computing the limitation involves finding the ratio of foreign-source taxable income to total taxable income. This fraction is multiplied by the tentative pre-credit U.S. tax on the taxpayer's total income to establish the amount of pre-credit U.S. taxes on the foreign income. This amount is the upper limit on the foreign tax credit. Roughly speaking, another way of expressing the foreign tax credit limitation is "U.S. tax rate (for example, 34 percent) times the lesser of foreign taxable income and worldwide taxable income." In a typical case, a corporate taxpayer might take a foreign tax credit for either foreign income taxes paid or the U.S. corporate tax rate times foreign taxable income, whichever is less.

The following example illustrates the computation of the foreign tax credit limitation. Assume that the U.S. taxpayer has foreign-source taxable income of $300 and U.S.-source taxable income of $200, for total taxable income of $500. Assume further that the pre-credit U.S. tax on the $500 is $170 (i.e., 34 percent of $500). Since 60 percent ($300/$500) of the taxpayer's total worldwide taxable income is from foreign sources, the foreign tax credit is limited to $102, or 60 percent of the $170 pre-credit U.S. tax. Thus, a taxpayer with foreign taxes paid in excess of $102 will be allowed a foreign tax credit of only $102 (the excess taxes paid may be carried to other years). If the taxpayer has paid less than $102 in foreign taxes, the taxpayer will have a foreign tax credit equal to the amount of the taxes paid. Under the limitation, then, a taxpayer may credit an amount equal to either the pre-credit U.S. tax on his foreign-source income or foreign taxes actually paid on foreign-source income (including foreign tax credit carryovers), whichever is less. Generally speaking, as U.S. tax rates go down (relative to foreign rates), the more likely it becomes that pre-credit U.S. tax on foreign-source income will be less than foreign taxes actually paid.

The manner in which the foreign tax credit limitation prevents foreign countries from effectively levying a tax on U.S.-source income and protects the U.S. Treasury's right to tax U.S.-source income may be illustrated as follows:

Assume that each of two taxpayers (taxable after June 1987 at a 34-percent U.S. rate) earns $100 of U.S. income; one of them earns no foreign income; the other earns $100 of foreign income and pays $50 of foreign tax on that income. The taxpayer with no foreign income owes $34 of U.S. tax. Absent a foreign tax credit limitation, the taxpayer with foreign income could credit the full $50 of foreign taxes. Then, the taxpayer with foreign income would owe only $18 of U.S. tax—the $68 pre-credit U.S. tax liability (on $200 of worldwide income) less the $50 credit. As a result of the high foreign taxes imposed, and allowed as a credit, the U.S. tax collected on the taxpayer's U.S. income would be reduced from $34 to $18. The limitation prevents such reduction of the U.S. tax base.

The foreign tax credit limitation thus tends to both (1) prevent other countries from taxing the U.S. tax base, and (2) protect the United States' right to tax U.S.-source income.

Overall and per-country limitations

Historically, the foreign tax credit limitation has been determined on the basis of either the taxpayer's total foreign income or the taxpayer's foreign income from each separate country, or both. These are known as the overall limitation and the per-country limitation, respectively.

Under the *overall method*, the taxpayer combines the income and losses from all foreign operations and allocates the pre-credit U.S. tax based upon this amount. Therefore, if 60 percent of the taxpayer's taxable income is from all foreign sources combined, then the foreign tax credit is limited to 60 percent of the pre-credit U.S. tax.

Under the *per-country method*, the taxpayer determines the foreign tax credit on a country-by-country basis. Thus, the taxpayer is allowed to take a foreign tax credit for taxes paid to any particular foreign country only to the extent that the taxes paid to that country do not exceed the limitation separately determined for that country.

In the Tax Reform Act of 1976, the Congress repealed the per-country limitation, making the overall limitation mandatory for most U.S. taxpayers. The overall limitation offers taxpayers an advantage over the per-country limitation, at least in years when they have no annual losses in any single country. The overall limitation allows taxpayers to credit any country's income tax so long as total foreign income—whether or not from that country—is high enough. One country's high tax may offset U.S. tax on income from a country that imposes no tax or a low tax. Under the per-country limitation, on the other hand, taxes paid to any foreign country offset only that portion of U.S. tax which is allocable to sources within that country. Many countries with foreign tax credit systems require taxpayers to use a per-country limitation in some or all circumstances.

Excess foreign tax credits

The U.S. foreign tax credit limitation affects the worldwide tax liability of those taxpayers who, as a result of the limitation, have excess foreign tax credits. Historically, these have included U.S. oil companies operating abroad, U.S. banks with foreign loans, and U.S. manufacturers manufacturing abroad. Excess foreign tax credits result when the amount of foreign creditable income taxes paid or accrued in a given year exceeds the taxpayer's foreign tax credit limitation. In general, this occurs when a firm is paying more foreign taxes than the firm would have paid in U.S. taxes had it earned the same income in the United States.

Excess credits also can arise from differences in the deduction allocation rules of the United States and those of other countries. For example, in those cases where a foreign country does not allocate a deduction for U.S.-performed R&D to income within that country, and the United States does, the foreign taxes will be higher than if the foreign country allowed the R&D deduction, and may exceed the foreign tax credit limitation.

Excess credits can arise for a variety of other reasons, all of which involve the limitation. Differences between the income-sourcing rules of the United States (whose rules are generally consistent with international norms generally recognized by developed countries) and those of other countries may result in U.S. treatment of income taxed by another country as domestic income for purposes of the foreign tax credit. Timing differences in the reporting of income and deductions under U.S. and foreign tax laws may result in a taxpayer's being unable to utilize some foreign tax credits in a year in which income is reported in a foreign country but not in the United States. Domestic losses may reduce worldwide taxable income and pre-credit U.S. tax and, hence, the amount of foreign tax credits that can be used currently.

Excess credits can be expected to arise because effective corporate income tax rates in many countries are higher than U.S. income tax rates. The importance of this factor was substantially increased by the reduction in corporate tax rates—from the old maximum average rate of 46 percent to the new maximum average rate of 34 percent—brought about by the Tax Reform Act of 1986. This rate reduction is likely to put many taxpayers previously having no excess credits into an excess credit position. It is estimated, for example, that after tax reform, foreign-source income earned by U.S. taxpayers in an excess credit position will be between two-thirds and three-quarters of all foreign source income of U.S. taxpayers. In the two most recent years for which data are available, on the other hand, the comparable fractions were only 43 percent (in 1980) and 42 percent (in 1982).

One way taxpayers may reduce or eliminate excess credits is to shift foreign operations to a foreign country or countries with effective foreign income tax rates equal to or lower than the U.S. income tax rates. Another method is to shift foreign operations to a foreign country or countries with deduction allocation and income-sourcing rules more closely resembling the U.S. rules. A third alternative is to bring the foreign operations back to the United States.

Code source rules for income and deductions

History

Rules for determining the source of gross income items have been part of the U.S. income tax law since 1918. In that year, Congress provided some source rules in connection with the tax on the income of foreign persons from sources within the United States.[17] In 1921, Congress enacted an expanded set of source rules for determining both gross income and net (taxable) income from sources within and outside the United States.[18] Congress also, in that year, limited the foreign tax credit to foreign taxes on foreign-source income. The present Internal Revenue Code provisions governing the allocation of income and deductions between U.S. and foreign sources, generally contained in sections 861-865, embody an approach similar to the provisions adopted in 1921.

Current Code provisions

Sections 861 and 862 of the Code list items of gross income that arise from sources within the United States ("U.S.-source gross income" or "U.S. gross income") and from sources outside the United States ("foreign-source gross income" or "foreign gross income"), respectively. Under section 861, U.S. gross income includes, generally, income from sales of inventory property manufactured in the United States and sold in the United States, wages and salaries for work done in the United States, rent paid for property located in the United States, dividends paid by U.S. corporations, and interest paid by U.S. persons. Under section 862, foreign gross income includes income from the sale outside the United States of inventory property manufactured outside the United States, royalties from the use outside the United States of patents, secret processes, and similar properties, and dividends paid by certain foreign corporations. Sections 865 and 988 of the Code, added by the Tax Reform Act of 1986, provide rules for determining the source of income from sales and other dispositions of certain types of personal property.

After determining the amount of *gross* foreign-source and U.S.-source income, taxpayers must determine *net* (or taxable) foreign-source and U.S.-source income. This determination brings deductible expenses into play. Generally, under sections 861 and 862, taxable income from U.S. or foreign sources is determined by deducting from the items of gross income treated as arising from U.S. or foreign sources, as the case may be, (1) those expenses, losses, and other deductions properly apportioned or allocated to those particular items and (2) a ratable part of any expenses, losses, or other deductions which cannot definitely be allocated to some item or class of gross income (secs. 861(b), 862(b)).[19] Under these principles, for example, a taxpayer with $100 of U.S.-source gross income, $80 of expense properly allocated to U.S.-source gross income, $100 of foreign-source gross income, $70 of expense properly allocated to foreign-source gross income, and $10 of expense that cannot definitely be allocated to U.S.- or foreign-source gross income, will split that $10 proportionately (in this case, evenly) between U.S. and foreign gross income. The taxpayer will thus have $15 of U.S.-source taxable income ($100-$80-$5) and $25 of foreign-source taxable income ($100-$70-$5).

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[17] *See* Revenue Act of 1918, secs. 214(b) and 234(b).

[18] *See* Revenue Act of 1921, sec. 217.

The Code generally articulates only the broad principles of how expenses reduce U.S. and foreign income, leaving it up to the Treasury to provide detailed rules for the allocation and apportionment of expenses.

Source rules for computing taxable income—Regulation sec. 1.861-8

Treasury Regulation sec. 1.861-8 ("the Regulation") applies in determining foreign-source taxable income for calculation of the foreign tax credit limitation.[20] It provides specific rules for the treatment of expenses, losses, and certain other deductions. Generally, as the first step in calculating foreign-source income, the Regulation requires a taxpayer to allocate his deductions to individual "classes" of gross income.[21] However, special rules are provided for the allocation and apportionment of R&D expenses; in general, R&D expenses are allocated to all income, regardless of class, reasonably connected with relevant product categories.

When a particular expense relates to a class of gross income including both U.S.- and foreign-source income, the Regulation generally prescribes no single method for apportioning deductions between the two. The Regulation states that the method used in apportioning a deduction must reflect the factual relationship between the deduction and the gross income. The Regulation contains a nonexclusive list of bases and factors to consider. Some of these relevant bases and factors are: a comparison of units sold (between sales yielding foreign-source and sales yielding U.S.-source gross income), a comparison of profit contributions, a comparison of gross sales or receipts, and a comparison of amounts of gross income. The Regulation's list contemplates that the higher the proportion of foreign sales or foreign gross income (for example), the greater, logically, the proportion of expenses attributable to foreign-source income.

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[19] Section 863 specifies that items of gross income, expenses, losses, and deductions other than those specified in sections 861 and 862 are to be allocated or apportioned to sources within or outside of the United States under regulations prescribed by the Secretary of the Treasury. Section 863 also contains general rules for computing taxable income when gross income derives from sources partly within and partly outside of the United States, as well as source rules for transportation income, space and ocean income, and international communications income.

[20] It also applies in determining the taxable income of a taxpayer from specific sources and activities for purposes of a number of other "operative" Code sections. The operative section for the foreign tax credit limitation is section 904(a).

[21] These classes include royalties, dividends, compensation for services, and gross income derived from business. A taxpayer must allocate his deductions on the basis of the factual relationships that exist between his deductions and his classes of gross income. The Regulation expresses this factual relationship concept this way: a deduction generally reduces a class of gross income if the deduction is incurred as a result of, or incident to, an activity, or in connection with property, from which the class of gross income has been, is, or could reasonably have been expected to be derived. If a deduction does not bear a definite relationship to a class of gross income, it is ordinarily treated as definitely related and allocable to all of the taxpayer's gross income; "all of the taxpayer's gross income" is then considered a class of gross income for purposes of applying the remainder of the Regulation. After a deduction has been allocated to a class of gross income, it is apportioned between a "statutory grouping" of gross income within the class, such as foreign-source gross income, and a "residual grouping," consisting of all other gross income in the class. The statutory grouping depends on the operative Code section. For example, when the operative Code section is 904(a) (relating to the foreign tax credit limitation) the statutory grouping is foreign-source gross income.

Several types of deductions are considered not definitely related to any gross income under the Regulation. These include, for example, the deductions for medical expenses and charitable contributions. These deductions reduce foreign and U.S. gross income pro rata.

The Regulation sets forth detailed allocation and apportionment rules for certain types of deductions, including those for research and development (R&D) expenditures, interest expenses, stewardship expenses, and legal and accounting fees and expenses. A detailed discussion of the rules for R&D deductions appears below.[22]

The Regulation was promulgated in its present form in 1977. It incorporates a number of significant modifications to a 1973 proposed revision[23] of the original Regulation, which was adopted in 1957.[24] These modifications were made in response to taxpayer comments on the proposed 1973 revision.[25]

Regulatory allocation and apportionment rules for R&D deductions

In general

The R&D rules of Treasury Regulation sec. 1.861-8(e)(3) ("the R&D Regulation") embody to some extent each of three approaches for allocation and apportionment of R&D expenses.[26] One approach, the place-of-performance method, assumes that these deductions relate straight-forwardly to the place where the R&D occurs. Another approach, the sales (or gross receipts) method, apportions the burden of R&D expense among the sources of the taxpayer's sales receipts. A third approach, the gross income method, apportions R&D expense among the sources of the taxpayer's gross income. The Issues section of Part III of this pamphlet examines the strengths and weaknesses of these approaches.

The R&D Regulation takes as its premise that R&D "is an inherently speculative activity, that findings may contribute unexpected benefits, and that the gross income derived from successful research and development must bear the cost of unsuccessful research and development." The R&D Regulation prescribes rules for allocating and apportioning these expenses between U.S.-source and foreign-source income.[27]

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[22] In addition, the Regulation provides rules relating to deductions in excess of gross income; exempt, excluded, and eliminated income; substantiation of allocations and apportionments: and intercompany pricing adjustments under section 482 or other sections of the Code.

[23] 38 Fed. Reg. 15,840 (1973).

[24] T.D. 6258, 1957-2 C.B. 368.

[25] An earlier proposed revision of the Regulation, published in 1966, 31 Fed. Reg. 10,405 (1966), was withdrawn at the time the 1973 proposed revision was published.

[26] Temporary modifications under the Tax Reform Act of 1986 to specific provisions of the Regulation are noted in the discussions of those specific provisions.

As explained in more detail below, the Economic Recovery Tax Act of 1981 (ERTA), the Deficit Reduction Act of 1984 (DEFRA), and the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) suspended these rules as they relate to U.S.-based R&D activity through taxable years beginning on or before August 1, 1986; they provided that taxpayers were to allocate all R&D deductions for R&D conducted in the United States to U.S.-source income during the suspension period.

For taxable years beginning during the period after August 1, 1986, and on or before August 1, 1987, the Tax Reform Act of 1986 provides for a temporary modification of the R&D Regulations. As described more fully below, the effect of the modification is generally to attribute more U.S.-based R&D to U.S.-source gross income than would be attributed under the (unmodified) R&D Regulation.

R&D expenses generally

As a general rule, business expenditures to develop or create an asset which has a useful life that extends beyond the taxable year, such as expenditures to develop a new product or improve a production process, must be capitalized. However, Code section 174 permits a taxpayer to elect to deduct currently the amount of "research or experimental expenditures" incurred in connection with the taxpayer's trade or business.

The Code does not specifically define "research or experimental expenditures" eligible for the section 174 deduction election (except to exclude certain costs). Treasury regulations (sec. 1.174-2(a)) define this term to mean "research and development costs in the experimental or laboratory sense." This includes generally all such costs incident to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property. The present regulations provide that qualifying research expenditures do not include expenditures "such as those for the ordinary testing or inspection of materials or products for quality control or those for efficiency surveys, management studies, consumer surveys, advertising, or promotions."

Product categories

The R&D Regulation associates R&D expenses with income from product categories. For example, it contemplates that R&D performed for a taxpayer's chemical business will not reduce that taxpayer's income from a separate textile mill business. It provides that R&D expenditures which a taxpayer deducts under Code section 174 are ordinarily considered definitely related to all income "reasonably connected" with one or more product categories of the taxpayer. The R&D Regulation enumerates 32 product categories based on two-digit classifications within the Standard Industrial Classification ("SIC") system.

Ordinarily, a taxpayer may divide R&D expenditures among relevant product categories, but not among subdivisions within the categories. When R&D is conducted with respect to multiple product categories, the categories may be aggregated for allocation purposes. When R&D cannot be clearly identified with one or more product categories (e.g., basic research), it is considered conducted with respect to all the taxpayer's product categories.

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[27] The Regulation also prescribes rules for the allocation and apportionment of deductions between pairs of gross income groupings other than U.S.-source and foreign-source income.

R&D to meet legal requirements

The R&D Regulation contemplates that taxpayers will sometimes undertake R&D solely to meet legal requirements (like noise pollution standards). In some such cases, the R&D cannot reasonably be expected to generate income (beyond de minimis amounts) outside a single geographic source. If so, those deductible R&D expenses reduce gross income only from the geographic source that includes that jurisdiction (Reg. sec. 1.861-8(e)(3)(i)(B)). For example, an R&D deduction for research performed solely to meet noise pollution standards mandated by the U.S. Government and which cannot reasonably be expected to generate significant foreign-source income reduces only U.S.-source income.

After allocating deductions to meet legal requirements, the taxpayer generally matches income to deductions on the basis of the place of performance of the R&D and the source of income from sales of products. At the taxpayer's election, the matching can involve the source of gross income.

Sales method of apportionment, step 1: Exclusive place-of-performance apportionment

The R&D Regulation presupposes that the place where R&D is performed (such as a laboratory) bears a significant relation to the source of the income it produces. Generally, the regulation allows 30 percent of deductible R&D expenses to reduce gross income from the source where over half of the taxpayer's total deductible R&D expenses are incurred (Reg. sec. 1.861-8(e)(3)(ii)(A)).[28] For example, assume that a U.S. manufacturer of gasoline engines sells them in the United States and abroad and performs all its R&D in the United States. It first subtracts 30 percent of its R&D deduction from U.S.-source income. (The manufacturer generally allocates the remaining 70 percent on the basis of sales, discussed below.)

The Regulation states that such place-of-performance apportionment "reflects the view that research and development is often most valuable in the country where it is performed, for two reasons. First, research and development often benefits a broad product category, consisting of many individual products, all of which may be sold in the nearest market but only some of which may be sold in foreign markets. Second, research and development often is utilized in the nearest market before it is used in other markets, and, in such cases, has a lower value per unit of sales when used in foreign markets."

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[28] This rule applies to expenses remaining after allocation under the legal requirements test. Moreover, under the temporary modifications enacted by the Tax Reform Act of 1986, the fraction of R&D allocated to the place of performance is 50 percent, rather than 30 percent.

Optional increase in place-of-performance apportionment

A taxpayer has the opportunity to apportion more than 30 percent of its R&D deduction exclusively to the source where R&D is performed if it can establish that a significantly higher percentage is warranted because the R&D is reasonably expected to have a very limited or long-delayed application outside that geographic source. Taxpayers will choose this method if foreign use of R&D results is minimal. There is no obligation to use this method (even if U.S. use of R&D results is minimal). Taxpayers that use this method must allocate any remaining portion of their R&D deduction only on the basis of sales.

To establish that R&D is reasonably expected to have a very limited application outside the United States, a taxpayer generally must show that only some of its products within the relevant product category are sold outside the United States. This involves a comparison of the taxpayer's own domestic and foreign sales plus sales of other users of the taxpayer's R&D: uncontrolled parties that sell products incorporating intangible property purchased or licensed from the taxpayer, and controlled corporations that can reasonably be expected to benefit from any of the taxpayer's research expense connected with the product category.[29]

To establish that R&D is reasonably expected to have a long-delayed application outside the United States, a taxpayer generally must compare the commercial introduction of its own products and processes in the United States and foreign markets and commercial introduction by other users of its R&D. To evaluate the delay in the application of research findings in foreign markets, the taxpayer is to use a safe haven discount rate of 10 percent per year unless he can establish that another discount rate is more appropriate.[30]

Sales method of apportionment, step 2: Apportionment on the basis of sales

After a taxpayer makes a place-of-performance apportionment, it must apportion the amount of its R&D deduction remaining, if any, on the basis of sales.[31] Generally, under this method, the remaining R&D deduction amount is apportioned between domestic- and foreign-source income on the basis of relative amounts of domestic and foreign sales receipts (Reg. sec. 1.861-8(e)(3)(ii)(B)).

Suppose, for example, that a taxpayer has foreign sales of $280, $200 in textiles and $80 in paper products, U.S. sales of $220, $200 in textiles and $20 in paper products, textile-related R&D expense of $100, and paper product related-R&D expense of $50. Assume that the taxpayer cannot allocate any portion of its R&D deduction under the legal requirements test and that the taxpayer is entitled to no place-of-performance allocation because no more than half of its R&D deduction is accounted for by R&D activities in any single country. The textile sales are in, and the textile-related R&D is connected with, the SIC two-digit product category "Textile mill products" (SIC major group number 22). The paper product sales are in, and the paper product-related R&D is connected with, the SIC product category "Paper and allied products" (SIC major group number 26). The textile-related R&D expense of $100 is apportioned $50 to foreign-source income and $50 to U.S.-source income because the taxpayer had $200 in foreign sales in the Textile mill product category and $200 in U.S. sales in the Textile mill products category. The paper-product-related R&D of $50 is apportioned $40 to foreign-source income and $10 to U.S. source income because the taxpayer had $80 in foreign sales in the Paper and allied products category and $20 in U.S. sales in the Paper and allied products category.

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[29] For purposes of comparing product sales within categories, products in "nonmanufactured" categories are limited to those listed in the Standard Industrial Classification ("SIC") manual; products in "manufactured" categories are limited to those enumerated at a seven-digit level in the U.S. Census Bureau's Numerical List of Manufactured Products.

[30] For these purposes, there is no requirement that the term "product" be limited to those defined in the SIC or Census Bureau classifications.

[31] Under the Tax Reform Act of 1986 temporary modifications, a taxpayer that makes a place-of-performance apportionment may alternatively apportion the remaining deduction on the basis of gross income, as described below.

Sales, for purposes of the sales method of apportionment, include amounts received from the lease of equipment. In addition, a "look-through" approach treats certain sales of parties other than the taxpayer as sales of the taxpayer in computing the apportionment of the taxpayer's R&D deduction between domestic- and foreign-source income. Under this look-through approach, the taxpayer's $200 in foreign textile sales in the above example might actually be sales of a foreign subsidiary licensing technology from the taxpayer or those of an uncontrolled party that has purchased secret processes from the taxpayer. The apportionment in such cases would be the same as in the preceding example.

The look-through rules provide that an uncontrolled party's sales of products involving intangible property obtained from the taxpayer are fully taken into account in determining the taxpayer's apportionment (and the apportionment of any other member of a controlled group of corporations to which the taxpayer belongs) if the uncontrolled party can reasonably be expected to benefit from the research expense connected with the product category (or categories). An uncontrolled party can reasonably be expected to benefit from a research expense if the taxpayer can reasonably be expected to license, sell, or transfer intangible property to that uncontrolled party. In the case of licensed products, if the amount of sales of the products is unknown, a reasonable estimate is to be made. Where intangible property is sold outright, and in cases where a reasonable estimate of sales of licensed products cannot be made, the sales of products are considered equal to 10 times the amount received or accrued for the intangible property during the taxpayer's taxable year.

A controlled corporation's sales of products are taken into account, to the extent explained below, if the controlled corporation can reasonably be expected to benefit from the taxpayer's research expense connected with the product category (or categories). A controlled corporation can reasonably be expected to benefit from the taxpayer's research expense if the taxpayer can be expected to license, sell, or transfer intangible property to that corporation, or transfer secret processes to that corporation. Past experience with research and development is to be considered in determining reasonable expectations. However, if the controlled corporation has entered into a bona fide cost-sharing arrangement (in accordance with Treasury Regulation section 1.482-2(d)(4)) with the taxpayer for the purpose of developing intangible property, then that corporation is not reasonably expected to benefit from the taxpayer's share of the research expense.

A controlled corporation's sales of products within a product category are taken into account to the extent of the greater of (1) the amount of sales that would have been taken into account if the controlled corporation were an uncontrolled party and if any intangible property contributed by the taxpayer to the controlled corporation were treated as a license of that intangible property; or (2) the amount of sales that bear the same proportion to total sales of the controlled corporation as the taxpayer's voting power in the controlled corporation bears to the total voting power in the corporation. However, sales between or among controlled corporations or the taxpayer are not to be taken into account more than once.

Sales, for purposes of the sales method of apportionment, do not include sales of products sold solely within the United States if the taxpayer has, on account of such sales, made an optional place-of-performance apportionment of significantly greater than 30 percent of his R&D deduction to U.S. income and established that the R&D connected with the products sold is reasonably expected to have a very limited application outside the United States (see paragraph (g) of the Regulation, Example 10).

Optional gross income methods of apportionment

Sometimes, using an "optional gross income method," a taxpayer may reduce allocation of R&D expenses to foreign-source income by as much as 50 percent.[32] Subject to certain limitations, a taxpayer may elect to apportion his R&D deduction under one of two optional gross income methods instead of the sales method. Under the optional method, a taxpayer generally apportions the remainder of his R&D deduction (after allocation under the legal requirements test but not the place-of-performance test) on the basis of relative amounts of gross income from domestic and foreign sources (Reg. sec. 1.861-8(e)(3)(iii)).[33]

The basic limitation on the use of optional gross income methods is that the respective portions of a taxpayer's R&D deduction apportioned to U.S.- and foreign-source income using a gross income method may not be less than 50 percent of the respective portions that would be apportioned to each such income grouping using the sales apportionment method (with the latter's exclusive place-of-performance allocation, typically 30 percent).[34] If this 50-percent test is satisfied when deductions (other than those allocated under the legal requirements test) are apportioned ratably on the basis of gross income, then, under "Option One," the taxpayer may use the income-based ratable apportionment to compute source-specific taxable income, without limitation.

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[32] Under the Tax Reform Act of 1986 temporary modifications, taxpayers can potentially reduce allocation of R&D expenses to foreign-source income without regard to this 50 percent limit.

[33] Under the Tax Reform Act of 1986 temporary modifications, taxpayers using optional gross income methods are entitled to allocate 50 percent of U.S.-based R&D (after allocation under the legal requirements test) to U.S.-source income before apportioning the remainder to foreign sources based on gross income.

[34] This limitation is suspended for one year by the Tax Reform Act of 1986.

If, on the other hand, a ratable apportionment based on gross income fails the 50-percent test, then, under "Option Two," the taxpayer apportions 50 percent of the amount of its R&D deduction which would have been apportioned under the sales method to that income grouping (i.e., U.S.- or foreign-source income) to which an income-based ratable apportionment allocates less than the required 50 percent. The remaining amount of its R&D deduction is apportioned to the other income grouping.

A taxpayer electing an optional gross income method, then, may be able to reduce the amount of its R&D deduction apportioned to foreign-source income to as little as one-half of the amount that would be apportioned to foreign-source income under the sales method.

For example, consider a taxpayer with $110 of U.S.-performed R&D expense and equal U.S. and foreign sales. Assume that $10 of the R&D expense is to meet legal requirements and is allocated to U.S.-source income. Under the sales method, 30 percent ($30) of the remaining $100 is exclusively apportioned to U.S.-source income and the rest ($70) is divided evenly between U.S.- and foreign-source income. Under an optional gross income method, the $35 foreign-source R&D allocation could be reduced as much as 50 percent, to $17.50. This could occur, for example, if the foreign sales were made by a foreign subsidiary that did not repatriate earnings to the U.S. corporation.

The optional gross income methods apply to all of a taxpayer's gross income, not gross income on a product category basis. If any member of an affiliated group which files a consolidated return uses an optional gross income method in a taxable year, then all members joining that return must use an optional gross income method in that taxable year.

Changes from 1973 proposed Regulation

The R&D rules of the present Regulation reflect a number of changes in and additions to the R&D rules included in an earlier proposed version of the Regulation issued in 1973.[35] Many of these modifications were liberalizations made in response to the comments of taxpayers on the 1973 proposed Regulation. The changes and additions include:

(1) Addition of the place-of-performance apportionment rules, that generally let a taxpayer apportion 30 percent or more of its R&D deduction to U.S.-source income;

(2) Addition of the legal requirements test, that lets a taxpayer allocate a portion of its R&D deduction solely to U.S.-source income when the corresponding R&D expenditures generate minimal income outside the United States and are mandated by a legal requirement (such as a U.S. Food and Drug Administration testing requirement);

(3) The division of an R&D deduction between product categories rather than general classes of gross income such as royalties from

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[35] 38 Fed. Reg. 15,840 (1973).

licensing intangible property or dividends; this change reduces allocations to foreign-source income of R&D expenditures related to products that are substantially different from the products that generate the foreign-source income; and

(4) The optional gross income methods of apportionment, which expressly permit a taxpayer to apportion some or all of its R&D deduction on a gross income-to-gross income basis, subject to limitations.

Treasury study and temporary suspension of Regulation

In the Economic Recovery Tax Act of 1981 (ERTA), the Congress directed the Treasury Department to study the impact of the R&D rules of Treasury Regulation sec. 1.861-8 on research activities conducted in the United States and on the availability of the foreign tax credit.

ERTA also provided that, for a taxpayer's first two taxable years beginning after the date of its enactment (August 13, 1981), all research and experimental expenditures (within the meaning of Code sec. 174) which were paid or incurred in those taxable years (and only in those taxable years) for research activities conducted in the United States were to be allocated or apportioned to sources within the United States for all purposes under the Code (sec. 223 of ERTA). ERTA did not change the Regulation's allocation rules for deductions other than that for research and experimental expenditures.

One reason for enacting this suspension of the Regulation's R&D rules as they relate to U.S.-based research activity (the moratorium) was that foreign countries would not, in some instances, allow deductions under their tax laws for expenses of research activities conducted in the United States and allocated by the R&D Regulation to foreign-source income. It was argued that this disallowance results in unduly high foreign taxes and that, absent changes in the foreign tax credit limitation, U.S. taxpayers would lose or defer utilization of foreign tax credits. Thus, went the argument, there was incentive for taxpayers to shift their research expenditures to those foreign countries whose laws disallow tax deductions for research activities conducted in the United States, but allow tax deductions for research expenditures incurred locally.

Accordingly, Congress concluded that the Treasury should study the impact of the allocation of research expenses under the Regulation on U.S.-based research activities.

Treasury study

On June 14, 1983, the Secretary of the Treasury submitted its report on the mandated study to the House Committee on Ways and Means and the Senate Committee on Finance.[36] In summary, the Treasury report concluded that:

- Had the Regulation fully been in effect in 1982, the $37 billion in privately financed domestic R&D spending in 1982 would have been reduced by between $40 million and $260 million—i.e., by between 0.1 and 0.7 percent. Most of the reduction would have represented a net reduction in overall R&D undertaken by U.S. corporations and their foreign affiliates, rather than a transfer of R&D abroad.

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[36] Department of the Treasury, *The Impact of the Section 861-8 Regulation on U.S. Research and Development* (June 1983).

- The moratorium reduced U.S. tax liabilities. If the R&D rules in the Regulation had been in effect in 1982, U.S. tax liabilities of U.S. firms would have been $100 million to $240 million higher.
- The moratorium reduced the tax liabilities only of firms with excess foreign tax credits. Whether or not a firm had excess credits did not seem to be closely related to the level of its R&D efforts.
- The moratorium had its most significant effect on large, mature multinationals, as opposed to small, relatively young high-technology companies. Of the Regulation's $100 million to $240 million estimated increase in U.S. tax liabilities, about 85 percent was estimated to be accounted for by 24 U.S. firms on the list of the 100 largest U.S. industrial corporations compiled by *Fortune Magazine*.
- An allocation of R&D expense to foreign income may increase a taxpayer's worldwide tax liability if the foreign government does not allow the apportioned expense as a deduction and the foreign tax paid exceeds the taxpayer's foreign tax credit limitation. Some allocation to foreign income, however, is appropriate on tax policy grounds when domestic R&D is exploited in a foreign market and generates foreign income. If an allocation is not made, foreign-source taxable income will be too high and the higher limitation may allow the credit for foreign tax to reduce U.S. tax on domestic-source income.
- The Regulation's R&D rules reflect significant modifications of the 1973 proposed Regulation in response to taxpayer comments. Compared to the 1973 version of the Regulation, these modifications allow taxpayers to allocate less R&D expense to foreign income and recognize that R&D conducted in the United States may be most valuable in the domestic market.

On the ground that a reduction in R&D might adversely affect the competitive position of the United States, the report stated that the Treasury supported a two-year extension of the ERTA moratorium. The rationale for this recommendation was to give Congress an opportunity to consider the findings of the report while Congress and the Administration worked to develop a coherent national program of R&D incentives.

Believing that it was appropriate both (a) to require allocation of deductions between U.S.- and foreign-source income, and (b) to provide tax laws generally encouraging U.S.-based research activities, Congress granted the recommended two-year extension of the moratorium in the Deficit Reduction Act of 1984 (DEFRA). The extension was expected to give Congress and the Treasury an opportunity to assess more fully the impact of the R&D Regulation on U.S.-based research activity and to compare the relative effectiveness of 100-percent allocation of U.S.-based R&D to U.S.-source income, on the one hand, versus other possible research incentives. A further one-year extension of the moratorium was enacted in the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA). Under the moratorium as enacted and extended through COBRA, taxpayers allocated all expenses of U.S.-based R&D to U.S.-source income in all taxable years beginning after August 13, 1981, and on or before August 1, 1986.

Tax Reform Act of 1986

Congress enacted temporary modifications to the R&D Regulation in the Tax Reform Act of 1986 (the 1986 Act or the Act), thus further suspending some, but not all, of the full impact of the Regulation. During taxable years beginning in the 12-month period after August 1, 1986, and on or before August 1, 1987, the R&D Regulation is essentially liberalized in three respects. The first liberalization is that, after allocating any R&D undertaken to meet source-specific legal requirements, 50 percent of all remaining deductions for U.S.-based research (called "qualified research and experimental expenditures" under the 1986 Act) are apportioned to U.S.-source income. The Act thus has the effect of increasing the exclusive place-of-performance apportionment percentage for U.S.-based research expense from 30 percent (under the Regulation's sales method) to 50 percent.

The Act further provides that, for the specified one-year period, the R&D expenditures that remain after any legal requirements allocation and the 50-percent exclusive place-of-performance apportionment will be apportioned either on the basis of sales or gross income. Thus, the Act's second effective liberalization of the regulation is to allow exclusive place-of-performance apportionment to taxpayers who use the optional gross income method, rather than only to taxpayers that use the standard sales method of apportionment. Third, the Act has the effect of allowing taxpayers to use the optional gross income method to reduce the R&D allocated to foreign-source income to less than half of what the allocation would be under the standard sales method.

Provisions of the Act directly addressing R&D allocations are not the only Act provisions substantially affecting the interaction of R&D expenses and the foreign tax credit. As described above, the foreign tax credit limitation is the product of (a) pre-credit U.S. tax and (b) a fraction equal to foreign-source taxable income over worldwide taxable income. The Act's temporary modification of the R&D Regulation generally increases the fraction (for a limited period). By itself, this increase would tend to raise the credit limitations of taxpayers with R&D expenses and foreign-source income, and thus reduce the overall tax liability of such taxpayers previously in an excess credit position. On the other hand, by lowering corporate tax rates from 46 to 34 percent, the Act decreased taxpayers' pre-credit U.S. tax. By itself, this decrease would tend to reduce all taxpayers' foreign tax credit limitations, thus increasing the number of U.S. taxpayers with excess foreign tax credits, and increasing the likelihood that any change in the R&D allocation rules will affect a taxpayer's overall tax liabilities.

Foreign countries' source rules for deductions [37]

It appears that few countries have developed detailed rules governing the allocation of expenses between foreign and domestic

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[37] This section is based chiefly on the collection of studies of the source, allocation, apportionment, and related rules of 24 countries published 7 years ago by the International Fiscal Association (IFA). *Rules for determining income and expenses as domestic or foreign*, LXVb Cahiers de droit fiscal international (1980). While the discussion in this pamphlet also incorporates the

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income (or taxable and nontaxable income). Thus, specific allocation rules for R&D expense, resembling those of Treasury Regulation sec. 1.861-8, are absent in most countries. This lack of detailed allocation rules may reflect a general lack of attention to the allocation issue. The most common approach to allocations appears to be a facts and circumstances test or a reasonableness test.

Many countries, however, recognize the general principle that expenses, to be deductible against income from a particular source, should be related to that income. These countries include Argentina, Australia, Canada, Finland, Hong Kong, Israel, Luxembourg, the Netherlands, New Zealand, South Africa, and the United Kingdom.

Some countries apparently have specific rules for R&D expense. Under Finnish law, for example, R&D expenses generally are deductible from the category or categories of income to which they relate. In New Zealand, R&D expenditures must be demonstrated to yield some benefit to the New Zealand economy to be deductible against New Zealand income. Switzerland, for purposes of treaty foreign tax credits, deems 50 percent of foreign royalties to represent expenses. In Japan, however, R&D expenses will not be allocated to offset foreign-source income. In addition, Canada apparently requires no allocation of R&D expense to foreign-source income.

Deductions in foreign countries for U.S. R&D

U.S. income tax treaties generally require our treaty partners to allow appropriate deductions for expenses incurred in the United States. Generally, however, under the treaties, these countries are required to allow deductions only for R&D expenses directly related to local income. Some R&D conducted in the United States within a product category that includes products sold in a foreign country may not bear a direct relation to local income. A foreign country's disallowance of deductions for such R&D when those amounts are allocated to foreign income under the R&D Regulation may, therefore, comport with its treaty obligations.

Even absent a treaty, a deduction for overseas R&D is within the scope of many countries' general rules governing deductions for overseas expenditures. Denmark, the Federal Republic of Germany, Ireland, the United Kingdom, and South Africa, for example, apparently do not generally distinguish in their internal law between domestic- and foreign-based R&D expenses for purposes of the deduction each permits for R&D expenses. However, foreign countries that recognize the right of taxpayers to deduct overseas expenses may not allow deductions in sufficient amounts to offset the impact of the R&D Regulation. Additionally, such countries may impose gross withholding taxes on royalty payments to U.S. companies for that R&D, potentially offsetting any tax benefits derived from favorable deduction rules.

Mexico does not generally permit foreign enterprises subject to Mexican income tax to deduct payments made to foreign companies not subject to Mexican income tax. The expenses incurred in re-

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fruits of more recent research on selected topics, conducted by the staff of the Law Library, Library of Congress, this pamphlet does not purport to be based on a comprehensive update of IFA's 1980 survey.

search and development, administrative and overhead expenses, and stewardship expenses normally would be included within the payments that the enterprise located in Mexico makes to the foreign country.

While some foreign countries may prohibit direct deductions for U.S.-performed R&D, the foreign subsidiary of a U.S. company may be able to take a related deduction in some cases by paying the U.S. parent an increased price for technology and components to reflect R&D costs. Transfer prices paid by foreign subsidiaries for technology and components often are deductible under foreign tax laws. On the other hand, if deductions from foreign taxable income can be taken for the value of technology developed in the United States and then transferred abroad or incorporated into products sent abroad, such deductions would generally be of less benefit than a deduction for R&D expenses when incurred; R&D tends to generate costs well before it generates transferable benefits.

Comparison of allocation methods

This section compares four methods of deducting R&D expenses by a taxpayer with $10,000 of U.S. sales and $10,000 of foreign sales (through a foreign branch). The taxpayer has $1,000 of U.S.-source taxable income and $1,000 of foreign-source taxable income before deduction of R&D expense. The taxpayer incurs $400 of R&D expense, all in the United States.

Table 1 shows the calculation of U.S. and foreign income under four methods. The first method, based on the proposed 1973 regulation, allocates R&D expense solely on the basis of sales (gross receipts). The second method is one of those available in the 1977 Regulation. Under the 1977 Regulation, the taxpayer described above is first permitted to apportion 30 percent ($120) of R&D expense to U.S.-source income (place-of-performance apportionment). The remaining $280 ($400-$120) of R&D expense is split equally between U.S.- and foreign-source income on the basis of gross receipts, which results in $140 of foreign-source and $260 of U.S.-source R&D expense (sales method apportionment).[38] The third method of apportionment, provided under the ERTA/DEFRA/COBRA moratorium, allocates the full $400 of R&D expense to U.S.-source income (place-of-performance apportionment). The fourth method, pursuant to the 1986 Act modifications to the 1977 Regulation, first apportions $200 of R&D expense to U.S.-source income based on place of performance, then splits the remaining $200 evenly between U.S.- and foreign-source income, resulting in a $100 apportionment of R&D expense to foreign-source income.

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[38] In these examples, the optional gross income methods do not yield a smaller foreign-source apportionment of R&D expense than the sales method. Operation in subsidiary form instead could reduce the foreign-source gross income to zero if the taxpayer did not repatriate income from the foreign subsidiary. In that case, an optional gross income method could be used to reduce the foreign-source apportionment of R&D expense by 50 percent under the unmodified Regulation, from $140 to $70, or by 100 percent under the temporary 1986 Act modification. Either of these allocations would be more favorable to the taxpayer than the allocations resulting from full repatriation of the foreign subsidiary's earnings.

Table 1.—Example of Apportionment of Domestic R&D Expense Under 1.861-8 Regulation and Moratorium

Item	U.S.-source	Foreign-source	Total
Gross receipts	$10,000.00	$10,000.00	$20,000.00
Income before R&D	1,000.00	1,000.00	2,000.00
R&D apportionment [a]			
1) 1973 Proposal	200.00	200.00	400.00
2) 1977 Regulation	260.00	140.00	400.00
3) Moratorium	400.00	0	400.00
4) 1986 Act	300.00	100.00	400.00
Income after R&D [b]			
1) 1973 Proposal	800.00	800.00	1,600.00
2) 1977 Regulation	740.00	860.00	1,600.00
3) Moratorium	600.00	1,000.00	1,600.00
4) 1986 Act	700.00	900.00	1,600.00
U.S. tax on worldwide income (pre-credit) [c]			
1) 1973 Proposal	272.00	272.00	544.00
2) 1977 Regulation	251.60	292.40	544.00
3) Moratorium	204.00	340.00	544.00
4) 1986 Act	238.00	306.00	544.00

[a] Apportionment of R&D expense described in text.

[b] Income after R&D equals income before R&D reduced by the R&D apportionment.

[c] U.S. tax on worldwide income (before the foreign tax credit) equals income after R&D times the post-June 1987 U.S. corporate tax rate (34 percent).

Table 2 illustrates the case where the taxpayer operates in a low-tax country and does not have excess foreign tax credits. The foreign country imposes tax at a 25-percent rate with no deduction for U.S.-performed R&D expense. The foreign taxable income is $1,000 (not reduced by R&D expense), and the foreign tax is $250. In this situation, the taxpayer would pay $294 of U.S. tax (after credit) under all four methods of apportionment. The total tax liability of $544 ($250 plus $294) is identical to the tax which would be owed if the taxpayer moved his foreign operations to the United States. Thus, the U.S. R&D apportionment rules are a matter of indifference for taxpayers who have no excess credits.

Table 2.—Tax Liability Under 1.861-8 Regulation and Moratorium: U.S. Taxpayer Without Excess Foreign Tax Credits

[25% foreign tax rate without a deduction for U.S. R&D]

Item	1973 Proposed Regs.	1977 Regs. (1.861-8)	Moratorium	1986 Act
U.S. tax on domestic income	$272.00	$251.60	$204.00	$238.00
U.S. tax on foreign income	272.00	292.40	340.00	306.00

Table 2.—Tax Liability Under 1.861-8 Regulation and Moratorium: U.S. Taxpayer Without Excess Foreign Tax Credits—Continued

[25% foreign tax rate without a deduction for U.S. R&D]

Item	1973 Proposed Regs.	1977 Regs. (1.861-8)	Moratorium	1986 Act
Foreign tax @ 25% rate	250.00	250.00	250.00	250.00
Foreign tax credit	–250.00	–250.00	–250.00	–250.00
Total tax liability	$544.00	$544.00	$544.00	$544.00
Average tax rate (percent)	34.0%	34.0%	34.0%	34.0%

Table 3 illustrates the case where the taxpayer operates in a relatively high-tax country and has excess foreign tax credits. The foreign country imposes tax at a 40 percent rate with no deduction for U.S.-performed R&D expense.[39] The foreign taxable income is $1,000 (not reduced by R&D expense), and the foreign tax is $400. In this situation, the U.S. tax liability depends on the method of apportionment: $272 under the 1973 proposed regulation, $251.60 under the 1977 Regulation, $204.00 under the moratorium, and $238.00 under the 1986 Act; the taxpayer's total tax liability is lowest under the moratorium method of allocation. Under all four methods, the taxpayer's total tax liability exceeds the tax which would be owed if the taxpayer moved his foreign manufacturing operations to the United States. However, if the foreign country permits a deduction for R&D expense, then the total tax liability of the taxpayer could perhaps be reduced.

Table 3.—Tax Liability Under 1.861-8 Regulation and Moratorium: U.S. Taxpayer With Excess Foreign Tax Credits

[40% foreign tax rate without a deduction for U.S. R&D]

Item	1973 Proposed Regs.	1977 Regs. (1.861-8)	Moratorium	1986 Act
U.S. tax on domestic income	$272.00	$251.60	$204.00	$238.00
U.S. tax on foreign income	272.00	292.40	340.00	306.00
Foreign tax @ 40% rate	400.00	400.00	400.00	400.00
Foreign tax credit	–272.00	–292.40	–340.00	–306.00
Total tax liability	$672.00	$651.60	$604.00	$638.00
Average tax rate	42.0%	40.7%	37.8%	39.9%

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[39] Prior to the 1986 Act, a foreign country imposing tax at a 40-percent rate would have been a low-tax country for these purposes.

Legislative Proposal

S. 716—Senators Wallop, Baucus, Danforth, Moynihan, Chafee, Roth, Boren, Pryor, Heinz, Durenberger, Armstrong, Riegle, Rockefeller, Symms, Lautenberg, and McCain

(Allocation of R&D Expenses to U.S. and Foreign Income)

S. 716[40] would retroactively reinstate, on a permanent basis, the R&D allocation rules provided on a temporary basis in ERTA, DEFRA, and COBRA. S. 716 would add a new subsection (f) to Code section 861 providing generally that all research and experimental expenditures (within the meaning of sec. 174) attributable to activities conducted in the United States are to be allocated to income from sources within the United States.

S. 716 would apply retroactively to taxable years beginning after August 1, 1986, and would expressly repeal the 1986 Act provision modifying the R&D Regulation.

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[40] Companion legislation, H.R. 1116, has been introduced in the House of Representatives.

Issues

1. Equity of the 1977 Sourcing Rules: The Excess Credit Issue

The basic reason for the limitation on the amount of the foreign tax credit is to protect the U.S. Treasury's tax base. With an unlimited credit, foreign countries effectively could levy a tax on U.S.-source income by raising their tax rates above 34 percent. The U.S. Treasury would bear the burden of this foreign tax, to which taxpayers could be indifferent. In other words, the Treasury would lose U.S. tax revenue on U.S.-source income.

As a consequence of limiting the foreign tax credit, a firm that operates in a high tax foreign country may pay more tax than a similar firm operating exclusively in the United States. The added tax burden is equal to the difference between the U.S. tax on (the U.S. definition of) foreign-source income and the foreign tax on the (foreign definition of) foreign-source income. This additional burden can be large when (1) the foreign tax rate is much higher than 34 percent, and/or (2) the foreign definition of the tax base is much broader than the U.S. definition of foreign-source income.

Opponents of the R&D allocation rules in Treas. Reg. sec. 1.861-8 argue that those rules are unfair since, in certain situations, firms are denied the effect of a full deduction for domestic R&D expense. This occurs when foreign taxes exceed U.S. taxes on foreign-source income because the foreign country denies a deduction for a share of U.S.-performed R&D expense. Opponents argue that the foreign tax credit limitation should be increased by permanently revising or repealing the apportionment of domestic R&D expense under the Regulation.

Proponents of the Regulation argue, however, that to increase the credit unilaterally (by revising or repealing the R&D Regulation) would effectively allow foreign governments to levy a tax on U.S.-source income, the burden of which would be borne by the U.S. Treasury. In their view the fact that excess credits may arise does not prove that the R&D sourcing rules are flawed. In addition, they argue that because taxpayers with excess credits effectively are exempt from U.S. tax on their foreign income, the portion of their R&D deductions that help generate such foreign income should not, in effect, operate like a deduction from U.S. tax on U.S. taxable income. They point out that other expenses that generate tax-free income—such as interest expense on borrowings made to purchase tax-exempt securities—are generally not deductible.

2. Misallocation Under the Moratorium: The Double Deduction Issue

As noted above, advocates of proposals to allocate all U.S.-based R&D to U.S.-source income argue that companies in an excess credit position are denied the effect of a full deduction for U.S.-performed R&D. It can be argued, however, that under the proposed rule, excess credit companies may obtain the equivalent of double deductions for at least a portion of U.S.-performed R&D expense.

This benefit potentially is available when a U.S. parent company deducts 100 percent of domestic R&D expense against U.S.-source income, and its foreign affiliate, in accordance with a tax treaty, deducts (against foreign tax) a royalty payment for exploitation of this R&D. Table 4 sets out the situation of a company that has excess credits due to earlier year operations in high-tax jurisdictions. The company does all its research in the United States and the research relates generally to both its manufacturing operations in the United States, and those of its foreign affiliate abroad. All manufacturing and research are assumed to fall within a single product category.

The foreign tax rate is assumed to be equal to the 34-percent U.S. tax rate. The parent company has $150 of worldwide net income before R&D expenses of $50. This $150 consists of $75 of net U.S.-source income and $75 of foreign-source income, the latter representing a distribution from the foreign affiliate of all of its net locally-generated proceeds. Gross worldwide sales receipts are equally divided between the parent and the affiliate. The foreign country allows the affiliate no deduction for U.S. R&D by the parent.

After the R&D deduction, worldwide taxable income is $100 and U.S. tax on worldwide income is $34. If all R&D expense is allocated to U.S.-source income, then foreign-source taxable income of the parent is $75, giving the parent a foreign tax credit limitation equal to three-quarters of $34, or $25.50.

Assume in the first instance that foreign tax on the affiliate equals $25.50, or 34 percent of $75, because none of the R&D expense offsets profits of the affiliate, and no royalty is payable to the parent in connection with use of its intangible property. The overall U.S. and foreign tax burden on the two corporations is $34. This is the same tax burden which the parent company would confront if it operated as one entity exclusively in the United States or in the other country.[41] But viewed from the Treasury's vantage, U.S. tax on U.S.-source taxable income has been reduced to $8.50, or 34 percent of $25, when in fact half of the parent's $100 in taxable income is fairly attributable to the United States. In essence the Treasury is giving the taxpayer an extra $25 deduction from U.S.-taxable income, even though that extra deduction is more properly attributable to income that is exempt from U.S. tax.

Now assume that the foreign affiliate characterizes $10 of its $75 payment to the parent as a royalty for current use of the proprietary knowledge produced by the $50 of domestic R&D. In tax treaty countries, foreign governments generally allow a deduction for royalty payments made to the U.S. parent that are directly related to local income; in this case, pursuant to such a treaty, the foreign country's definition of the affiliate's domestic-source income is reduced by $10, and foreign taxes are reduced by $3.40. The U.S. definition of foreign-source income is unchanged (since the royalty, like the dividend, is treated as foreign-source income of the parent), so the foreign tax credit limitation is unaffected. The tax paid to the United States is not increased by the decrease in foreign tax, because both (a) the credit limitation remains the same, and (b) excess credits can be employed.

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[41] This statement assumes, of course, that the foreign taxing jurisdiction allows a deduction in full for R&D expenses as they are incurred.

The enterprise has reduced its total tax liability by $3.40, from $34 to $30.60, by characterizing $10 of the payment to the parent company as a royalty rather than a dividend. The reduction occurs because $10 of the R&D expense effectively has been deducted a second time. The first deduction was the $50 reduction of U.S.-source income corresponding to the R&D expense. The second deduction effectively occurs when foreign taxes are reduced as a result of the $10 royalty payment, while U.S. taxes remain the same. Because the royalty payment is treated as entirely foreign-source income of the parent and because the parent has excess credits, the company's total tax burden ($30.60 on $100 of worldwide income) is less than it would be if it operated exclusively in the United States or the other country, each of which imposes $34 of tax on $100 of worldwide income.

Table 4.—Example of U.S.-Allocated R&D Expense and Royalty Income

Item	U.S. source	Foreign source	Total
Income before R&D	$75.00	$75.00	$150.00
R&D deduction	50.00	0.00	50.00
Taxable income	25.00	75.00	100.00
Pre-credit U.S. tax	8.50	25.50	34.00
FTC limitation	0.00	25.50	25.50
FTC carryover available from prior year		3.40	3.40
(1) Net receipts of foreign affiliate repatriated as dividend			
Foreign tax on current income	0.00	25.50	25.50
Post-credit U.S. tax	8.50	0.00	8.50
Total tax	8.50	25.50	34.00
(2) $10 repatriated as royalty; balance repatriated as dividend			
Foreign tax on current income	0.00	22.10	22.10
Post-credit U.S. tax	8.50	0.00	8.50
Total tax paid currently	8.50	22.10	30.60

Critics of allocating U.S.-based R&D solely to U.S. income argue that for the foreign tax credit to operate properly, only the portion of expenses incurred for the production of U.S. income should reduce U.S.-source gross income. From this viewpoint, allocation of R&D solely to the United States is flawed since it permits all domestic R&D expenses to be deducted from U.S.-source income even where a portion of this expense is related to the production of foreign source income. Those in favor of 100 percent allocation to U.S.

income, however, argue that the R&D apportionment rules are arbitrary, complex, and counterproductive to the U.S. economy.

3. Export of Research and Development Activity

The principal reason for enacting and renewing the moratorium on apportionment of R&D expense under the 1977 Regulation was Congressional concern that the regulation encouraged multinational businesses to shift R&D activities abroad. However, according to the Treasury Department's June 1983 study, the impact of the R&D Regulation (at least under the old tax rates) was unclear. Based on National Science Foundation data, the Treasury study shows that, following the promulgation of Treasury Reg. sec. 1.861-8 in 1977, the foreign-performed share of R&D expenses by U.S. companies and their foreign affiliates dropped from 9.08 percent in 1978 to 8.20 percent in 1981.[42] Thus, the aggregate statistics did not show a shift of R&D offshore after the Regulation was adopted; however, the Treasury study notes that the foreign share of R&D does not depend solely on taxes.

The Treasury study also reviewed several economic analyses of the overseas R&D activity of multinational companies. This survey indicated that U.S. multinationals locate R&D offshore primarily to transfer developed technology or to adapt technology to indigenous factors of foreign markets, rather than to develop new technologies or new products for a worldwide market. The literature survey also indicated that there are important efficiency advantages of centralized R&D which make the establishment of offshore R&D units unattractive to multinational companies. The Treasury study concluded that, "Based on these considerations, it appears that foreign R&D is not highly substitutable for R&D performed in the United States." [43]

The primary importance of factors other than taxes in the R&D location decision was confirmed in a study by Arthur Andersen and Company. Based on a survey of 85 major multinational firms, the Arthur Andersen study found: "The results indicate that the most common incentive for determining timing, placement, and scope of R&D projects is the competency of the available workforce. The geographical location of necessary raw materials and research data was the second most frequent response." [44]

While the Arthur Andersen study found that taxes have some influence on the location of R&D investment, this factor was not of primary importance to the firms included in the survey.

Based on the Treasury study, and the other economic analyses cited therein, it would appear that there is little evidence that the 1977 Regulation resulted in a large shift of R&D offshore, at least under pre-tax reform rates, or that such a shift would have occurred had the Regulation's R&D rules been reimplemented prior to tax reform. Also, it should be noted that shifting R&D activity offshore is not the only tax planning strategy available for reducing excess credits. An alternative option is to shift manufacturing activity to the United States or from a high tax foreign country to a low tax country. (Ireland is a popular low tax country for firms manufacturing for the European market). In addition, royalty or cost-sharing payments to the United States may in some cases be feasible means of reducing excess credits.

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[42] Department of the Treasury, *The Impact of the Section 861-8 Regulation on U.S. Research and Development* (June 1983) p. 25.

[43] Treasury study, p. 28.

[44] Arthur Andersen and Co., *National Research and Development Study*, January 1983, p. V-3.

There may be situations where a U.S. company can most easily reduce excess credits by locating R&D offshore, and under these circumstances tax considerations may influence the location of R&D activities. However, even in those circumstances, the taxpayer would have to weigh the benefits to be gained through using extra foreign tax credits against the costs that may be incurred in foregoing the relatively favorable provisions of the Code relating to R&D in general. (*See* Issue No. 5 below.)

Opponents of allocating all U.S. R&D expense to U.S.-source income argue that such a rule has some tendency to encourage firms to shift manufacturing operations and, hence, manufacturing jobs overseas. The reason is that the rule reduces the tax costs of operating in high tax foreign jurisdictions for some taxpayers, thereby increasing the relative attractiveness of operating abroad. Suspending the R&D Regulation (and, to a lesser extent, modifying the Regulation in the 1986 Act) reduced tax costs by increasing the amount of foreign taxes that can be credited to reduce U.S. tax. Proponents of 100-percent U.S. allocation argue that non-tax factors play at least as big a part in determining locations of plants (and manufacturing jobs) as they do in determining locations of laboratories (and R&D jobs). Opponents of 100-percent U.S. allocation, on the other hand, contend that individuals who can do manufacturing work are likely to be available throughout the world, while assembling a group of qualified researchers may only be possible at a much more limited number of locations.

4. The Moratorium as an Incentive for Domestic R&D

As indicated above, some argue that some firms may reduce research expenditures as a result of the Regulation's R&D rules. The suspensions of the R&D rules, it is asserted, were an R&D incentive.

The Treasury study examined this issue and found that as a result of suspending the Regulation's R&D rules, privately financed U.S. R&D was increased in 1982 between 0.27 and 0.65 percent or between $40 million and $260 million. The revenue cost of the moratorium in 1982 was estimated to be in the range of $100 million to $240 million. Thus, the increase in domestic R&D per dollar of revenue loss is estimated to range from $0.17 (40/240) to $2.60 (260/100).

Because the number of taxpayers with excess foreign tax credits will rise substantially under the new 34-percent corporate income tax rates, the effect of changes in the allocation and apportionment rules on R&D activity and Treasury tax receipts will probably be accentuated. Assuming that the Treasury's previously estimated range of elasticities of demand for domestic R&D remains valid under present law, the ratio of R&D increases to revenue lost will remain within the previously estimated range. However, it is expected that, at any given level of R&D activity, the revenue effect of any rule change will be greater than what it would have been under the old corporate rates.

The question arises whether modification of the R&D rules is an efficient method for stimulating R&D compared to other tax incentives, or to government sponsored R&D. When the Federal Government funds an R&D project, there is a one dollar increase in R&D for each dollar authorized. However, if all U.S.-based research is allocated to U.S. income, the tax revenues foregone could exceed the dollar value of increased private R&D. The Treasury study also pointed out that the tax benefits of dropping the R&D rules would, at that time, have been highly concentrated: 24 firms were estimated to obtain 85 percent of the benefit. In addition, the benefit would go only to firms with excess foreign tax credits and these may not be the same firms with the most promising research opportunities. The Treasury study concluded:

> All firms are not affected uniformly by the suspension of the regulation. It only reduces the tax liabilities of firms in an excess foreign tax credit position. These firms earn from 16 percent to 22 percent of the worldwide income of U.S. manufacturing corporations. Whether or not a firm is in an excess credit position does not seem to be closely related to the level of its R&D effort. The suspension of the regulation has its most significant impact on large, mature multinational firms, as opposed to small, emerging, high technology companies.

Thus, the Treasury study implied that there may be more effective, less haphazard methods to increase domestic R&D, at a lower revenue cost, than the repeal of the R&D rules of the Regulation. Under current law, the basic premise of this conclusion may be valid. For instance, the present credit for certain R&D expenses may encourage the pursuit of basic research by universities and other exempt organizations. Such research by exempt organizations does not benefit so clearly from an incentive relating to the allocation of R&D expenses. And even though corporate tax rates have been reduced by the Tax Reform Act of 1986, it generally remains true that many firms will not be in an excess credit position, and those that are may make R&D decisions based on non-tax, as well as tax, considerations.

On the other hand, the rate reduction potentially modifies the conclusions reached in the Treasury study. The percentage of worldwide income of U.S. corporations earned by firms in an excess foreign tax credit position is expected to rise as a by-product of the rate reduction, with the result that any change in the R&D allocation rules can now be expected to have a more uniform effect, from firm to firm, than was true in 1983. Consequently, the rate reduction tends to make any future revision of the R&D allocation rules a relatively more efficient mechanism for influencing taxpayers' R&D decisions. This is because the mechanism works only on taxpayers with excess credits, and it works better to the extent that it causes a greater proportion of taxpayers to face similar incentives for undertaking R&D in the United States.

5. Competitive Position of U.S. Firms in the World Marketplace

Opponents of the Regulation claim that U.S. firms are at a disadvantage relative to foreign firms since, according to the Arthur Andersen and Co. study, no country other than the United States specifically requires allocation of a portion of domestic R&D expense to foreign-source income. However, foreign countries may require allocations of domestic R&D expense to foreign-source income under their general tax principles. Moreover, in order to determine the relative tax advantage of international competitors in the conduct of R&D, it is necessary to examine all aspects of the tax system which influence the rate of return on R&D development projects. The U.S. tax system provides a number of incentives to R&D which may, on balance, offset the Regulation's R&D rules. First, most R&D expenses may be deducted in the year they are incurred even though the income resulting from the use of this knowledge may stretch out over many years (e.g., as long as 17 years in the case of a patent). Second, a 20 percent tax credit is now allowed on increases in U.S.-based R&D expenditures. Finally, as a result of the possessions tax credit (Code sec. 936), U.S. companies with possessions affiliates can effectively exempt from U.S. tax up to half of certain income attributable to R&D.

Thus, the international competitiveness of U.S. companies in high technology industries is influenced by a variety of provisions in the U.S. tax Code. While the R&D allocation rules may disadvantage U.S. companies relative to their foreign competitors, other provisions of the Code, such as the R&D credit, may offset this disadvantage.

6. Matching R&D Expenses with U.S. and Foreign Income

In general

U.S. income tax law generally attempts to match deductions for expenditures with the income that the expenditures help generate. This is done to measure income more accurately for purposes of imposing tax on the income from a particular source, a particular year, or a particular activity. To accurately measure income in a particular year, for example, capital expenses generally are not deductible in full in the year paid or incurred, but must be deducted ratably over the period of years during which they generate income. To accurately measure income from taxable activities such as investments, a deduction is generally denied for interest paid or incurred with respect to funds borrowed to invest in securities yielding tax-exempt income. And to accurately measure foreign-source income and U.S.-source income, the Code requires allocation and apportionment of deductions between foreign and domestic gross income. Without a proper computation of foreign-source income, the foreign tax credit could not properly function.

Determination of the source of income that R&D deductions should offset, however, raises difficult issues. Part of the difficulty arises because laboratories and other R&D facilities are cost centers, not profit centers. Much R&D never results in any income. The scientific method of trial and error sometimes produces no commercially valuable results. Expenses incurred for unsuccessful research are generally tax-deductible, however. For the foreign tax credit system to function, those expenses for unsuccessful research must reduce foreign income or U.S. income (or some of each).

In general, expenses that do not yield current income are not currently deductible. Congress, however, has enacted a special rule (sec. 174) generally making R&D currently deductible even though it will not yield current income. Expenses that reduce taxable income must figure into the calculation of the foreign tax credit limitation. A foreign tax credit system that allocates current R&D expenses against current income may yield distorted results, because current income often arises more from past R&D than from current year R&D. This timing difference tends to distort any system that allocates current R&D expenses against current income. For instance, a taxpayer who has just begun foreign operations may have little current measurable foreign activity. If foreign operations expand in the future, however, current research may significantly benefit future foreign operations. If the taxpayer performs no R&D in those later years of profitable foreign operations, it is likely that any method (over the entire period) will overstate foreign income.

Moreover, it is especially difficult to allocate basic research expenses to foreign or U.S. income. And even focused research yields unanticipated results.

In summary, accurate tracing of R&D expenses to income presents severe practical problems. The R&D Regulation provides taxpayers with a limited opportunity to trace R&D expenses to income. Tracing is available only on the basis of "reasonable expectations" of "very limited or long-delayed application" of the R&D results outside the United States. The taxpayer must satisfy the Commissioner of the propriety of the tracing. The vagueness of this standard illustrates the difficulty of a tracing approach.

The Regulation's R&D rules embrace elements of each of three competing approaches to R&D deductions (in addition to their limited tracing approach). The Regulation's exclusive geographic apportionment rules are an application of the place-of-performance approach; the sales method is an application of the gross sales approach; and the optional gross income methods are an application of the gross income-to-gross income approach.

Place-of-performance rules

Advocates of a place-of-performance approach argue that there is no alternative to it that is not vague or arbitrary. In some cases, a straight place-of-performance rule may produce the theoretically proper measure of U.S. and foreign income. For example, a taxpayer conducts organic chemical research in the United States on methods of eliminating an agricultural pest found only in this country. The taxpayer earns all of its foreign income by manufacturing and selling inorganic chemical compounds in Europe. The taxpayer earns U.S. income by manufacturing and selling both organic and inorganic chemical compounds in the United States. The taxpayer's organic chemical research apparently bears little or no relation to its foreign income. For that reason, the expenses of that research should perhaps not reduce foreign income at all.

Opponents of a straight place-of-performance rule would not agree to its application in this case. There is some chance that the taxpayer's research will result in products that the taxpayer can manufacture abroad or processes that the taxpayer can use to earn foreign income.

Opponents of a place-of-performance rule argue that the R&D Regulation would reach the proper result by treating this case as one involving very limited foreign use of the R&D. Under the R&D Regulation's optional place-of-performance rule, presumably less than 100 percent of the taxpayer's R&D deduction would be apportioned to U.S. income.[45] Proponents of a straight place-of-performance rule reply that the optional place-of-performance rule yields complexity and confusion in this case.

Alternatives to the place-of-performance method

In some cases, the gross sales method (the rule of Reg. sec. 1.861-8(e)(3)(ii)(B)) or the gross income-to-gross income method (the rule of Reg. sec. 1.861-8(e)(3)(iii)) may produce the theoretically proper measure of U.S. and foreign income. Assume that a taxpayer owns U.S. and foreign patents for one drug. The taxpayer's only business is manufacturing that drug. The taxpayer manufactures in two factories, one in the United States and one in Germany (through a German branch). Profit margins and costs of production in these two factories are identical. The taxpayer conducts research in a U.S. laboratory. The focus of that research is improvement of the one drug patent that the taxpayer owns. Both gross foreign sales and income and gross U.S. sales and income appear to bear some relationship to the U.S. R&D. Comparison of gross sales is administratively feasible, and might be a proper way of allocating R&D expenses. Comparison of gross income is also administratively feasible, and would yield the same allocation of R&D expenses in this case.[46]

Proponents of a place-of-performance rule would argue that the U.S. R&D is more likely to produce U.S. income than foreign income, however. Any improvements that the R&D creates may be more likely to appear first in the U.S. market. There are several factors that could cause first U.S. appearance, including: proximity of the U.S. laboratory to the U.S. plant, familiarity of researchers with the U.S. market, greater political risk in the foreign country, familiarity of the company's marketers with the U.S. market, competition in the foreign market from unsafe drugs that cannot meet U.S. standards, and likelihood that foreign competitors will infringe on the improvement. Moreover, although the R&D is focused on an existing product, it might well result in a new product or process that produces only or primarily U.S. income.

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[45] The R&D Regulation's optional place of performance rule has provoked debate. As discussed above, the R&D Regulation permits a taxpayer who qualifies for a 30-percent apportionment of his R&D deduction to income from one geographic source to apportion to that income a percentage of his R&D deduction "significantly greater" than 30 percent. He may do so if he establishes that the higher percentage is warranted because the R&D is reasonably expected to have a very limited or long-delayed application outside the geographic source. The R&D Regulation does not define the term "significantly greater." One example given in the Regulation (Example (10)) suggests that an apportionment to income from the geographic source that is 34 percent higher than the apportionment yielded by application of the base line percentage might, at least in some circumstances, be considered significantly greater; another example given in the Regulation (Example (9)) suggests that a 6-percent differential would not be. Taxpayers have argued that the Regulation should give taxpayers more specific guidance on this point.

[46] For simplicity, the example equates profit margins and costs of production in the two factories owned by a single corporation, so that the two methods yield the same allocation. A comparison of two methods when they do not yield the same allocation appears below.

Comparison of gross sales and gross income methods

Both the gross sales rule and the gross income rule involve difficulties. A sales method involves practical difficulties. For example, assume that a U.S. taxpayer who manufactures and sells an automobile windshield defrosting device in the United States and licenses the device for manufacture and sale abroad by foreign automobile makers. The taxpayer's gross U.S. sales are its sales of the windshield defrosting device in the United States. Determination of gross foreign sales is more difficult. One application of the sales method and look-through rules would compare these sales with those of the foreign licensee, which are sales of automobiles. The automobile sales reflect many cost components of the automobiles other than the windshield defrosting device, so this comparison seems inappropriate.

To deal with the difficulty of estimating third-party licencees' (and purchasers') sales, the R&D Regulation adopts a deemed sales price for certain licensed (and purchased) intangibles of ten times the amount received for the intangibles. Critics note the arbitrariness of this deemed sales figure.

Advocates of the sales method point out that arbitrariness can be avoided sometimes because taxpayers exercise a degree of control over whether the look-through rules of the sales method are applied and, thus, over whether sales of certain foreign entities will be treated as the taxpayer's own for purposes of apportioning R&D expense. For example, the R&D Regulation provides that if a U.S. taxpayer and its controlled corporation enter into a bona fide cost-sharing arrangement for purposes of developing intangible property, then the controlled corporation's sales relating to the intangible property will not be treated as the taxpayer's for purposes of apportioning the taxpayer's R&D expense.

Critics of the sales method argue that the gross income-to-gross income method avoids the comparison of sales (or deemed sales) in all cases and, in addition is easier to use than the sales method, has been approved by U.S. courts, and had been used widely by U.S. taxpayers for many years.

Critics of the sales method also point out that the method seems to produce arbitrary results in some circumstances. For example, suppose that the sales method is used by a U.S. licensor who negotiates a large up-front license fee from a foreign company with the proviso that the fee will reduce future royalties. If the licensee makes few sales in the year in which the up-front fee is paid, most of the foreign-source income from the license will not cause R&D expense to be apportioned to foreign-source income.

On the other hand, the gross income-to-gross income method may encourage U.S. taxpayers to license technology to foreign manufacturers instead of utilizing the technology themselves to manufacture products for sale abroad. Assume that the before-tax return would be the same from these two alternatives. If the sales method were mandated, foreign sales would be taken into account in apportioning the R&D expense to foreign-source income in either case. If, however, the gross income-to-gross income method were used, foreign sales would be taken fully into account only if the taxpayer chose to manufacture and sell directly.[47] If the taxpayer chose to license the relevant technology to others instead, foreign license fees only, likely equaling a small percentage of the licensee's foreign sales, would be taken into account in apportioning R&D expense to foreign income.

Use of the gross income-to-gross income method also may, in contrast with the sales method, result in a smaller apportionment of R&D expense to foreign-source income when foreign operations are conducted through a subsidiary as compared to a branch. The reason is that gross income attributable to a foreign subsidiary generally includes only profits distributed to the U.S. parent and not retained for foreign investment. A U.S. parent generally can control the timing of these dividends and thus can potentially reduce gross income from foreign sources to zero in a given year and thereby avoid any allocation of R&D expense to foreign-source income. Moreover, the dividends represent the foreign subsidiary's receipts net of depreciation, interest, and other indirect expenses. To the extent of its own operations, on the other hand, the gross income of a U.S. parent generally includes receipts whether reinvested or not and whether offset by expenses or not. If the U.S. corporation has a foreign branch, the gross income of the latter is a component of the U.S. corporation's gross income. Whether operations are conducted through a foreign subsidiary or a foreign branch bears no relation to the connection between particular R&D activities and types of income. The gross income-to-gross income method's distinction between branch and subsidiary operations, therefore, seems unwarranted.

At least in part for this reason, the unmodified R&D Regulation limits the application of the gross income-to-gross income method to cases when its results do not diverge too greatly from those of the gross sales method. However, under the 1986 Act, this restraint on the potential distortions of the gross income method, as applied to subsidiary operations, is temporarily lifted. Under the modified regulation, U.S. enterprises operating abroad through subsidiaries are allowed an exclusive 50-percent allocation of R&D deductions to the place of performance, followed by apportionment of the rest on a basis that could lead to disproportionate results: comparison of U.S. *gross* income of the parent with distributed *net* income of the subsidiary.

In addition, the gross income-to-gross income method may give U.S. taxpayers a limited incentive to underprice technology transfers to related parties abroad when the technology is developed through substantial research expenditures. Code section 482 allows the IRS to correct any improper transfer prices, but it has proved difficult to administer in practice. In any case, section 482 would not necessarily give the IRS authority to readjust transfer prices based on R&D performed in the same year as the transfer, absent an unusually short lead time between research and product improvement.

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[47] In the case of the direct manufacturing and sales alternative, the gross income method would account for sales through foreign branches directly; the gross income method would generally account for sales of foreign subsidiaries indirectly, only upon payment of subsidiary dividends, and then only to the extent of the subsidiary's net (rather than gross) income.

Breadth of product categories

Critics of the Regulation's R&D rules argue that the prescribed product categories are too broad. They point out that research which relates solely to a product sold in the United States may nonetheless be apportioned to foreign-source income when a second product, falling in the same product category as the first, happens to be sold abroad. For example, an apportionment to foreign-source income of R&D expense relating to bulldozers manufactured and sold solely in the United States may be required when the taxpayer manufactures and sells small gasoline engines for lawnmowers abroad because the bulldozers and lawnmower engines fall in the same product category.[48]

As another example, a taxpayer performs basic pharmaceutical research in the United States in an effort to create new antibiotics. The taxpayer's U.S. plants produce a variety of antibiotics for the U.S. market, while the taxpayer's foreign plants produce only aspirin for foreign markets. Nonetheless, under the R&D Regulation, antibiotics and aspirin are in the same product category, and the general rules of the Regulation would allocate some of the R&D expense to foreign-source income unless the taxpayer met the burden of showing very limited or long-delayed application of the R&D abroad. Proponents of the R&D Regulation argue that this result may in fact be the correct one. For example, although the taxpayer does not use the basic research in producing aspirin, the taxpayer might not use it immediately in producing antibiotics, either.[49] Also, the taxpayer might begin making substantial foreign sales of any new drug its R&D creates.

Critics of the R&D rules argue that the use of narrower product categories (for example, three-digit instead of two-digit SIC categories) should be permitted. Alternatively, they argue that allocation should be permitted on a project-by-project basis and product categories should be eliminated.

Narrower product categories might, however, eliminate the R&D rules' capacity to take into account for apportionment purposes that R&D sometimes contributes unexpected benefits. For instance, in the bulldozer/lawnmower example above, it is assumed that the R&D relating to the bulldozers yields no results applicable to the lawnmower engines. But in some circumstances, a taxpayer's bulldozer-related R&D might unexpectedly benefit its lawnmower engine line.

Also, the structure of the product categories Wholesale trade and Retail trade sometimes allows a taxpayer to apportion all of its R&D expense relating to a product that sells both in the United States and abroad to U.S.-source income. This may be viewed as a mitigating factor in connection with the breadth of the product categories.

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[48] *See* paragraph (g) of Regulation, Example (4).

[49] If the expenditures in this case were for testing existing products rather than for developing new products, they are related to income from those products. Such expenses are not subject to the allocation rules of the R&D Regulation. *See* Treas. Reg. sec. 1.174-2(a)(1). Therefore, such expenses would typically be deductible from U.S.-source income.

For example, suppose a U.S. corporation manufactures and sells forklift trucks in the United States and distributes them abroad through a wholesaling subsidiary. The U.S. corporation performs R&D relating to the forklift trucks but none relating to wholesale trade. The manufacture and sale of forklift trucks in the United States belongs to the product category Transportation equipment, but the wholesaling of the trucks abroad will generally belong to the product category, Wholesale trade. None of the U.S. corporation's R&D expense attributable to the forklift trucks is allocable to the wholesaling subsidiary's sales abroad because those sales are in a different product category (Wholesale trade) from the product category to which the sale and manufacture of forklift trucks belong and to which the R&D relates (Transportation equipment).[50]

Treatment of basic research

The treatment of basic research expense under the R&D rules has also been questioned. The Regulation states that R&D that cannot be clearly identified with one or more product categories is to be divided among all product categories. One of the examples given in the Regulation (Example (15), at paragraph (g) of Regulation) indicates that the Internal Revenue Service might regard some basic research as not clearly identifiable with any product categories and, thus, properly attributable to all product categories. In the example, basic research expense incurred by a U.S. manufacturer of heating equipment is considered related to all the manufacturer's product categories and, as a result, is allocated in part to income from the manufacturer's foreign hotel subsidiary.

Critics of the Regulation's R&D rules argue that this allocation is unfair. In their view, basic research expense generally should not be divided among all product categories. They argue that while basic research, by its nature, is less narrowly focused than applied or developmental research, basic research is frequently undertaken specifically in relation to one product or a group of products to the exclusion of others. Therefore, basic research expense should generally be attributable to one or a few of a taxpayer's product categories rather than all the taxpayer's product categories.

Advocates of the R&D Regulation respond that it may be possible to allocate basic research expense in this manner under the Regulation as presently drafted. To do so, a taxpayer must show that his basic research *is* clearly identified with certain product categories. The fact that the basic research may relate to several of the taxpayer's product categories should not normally prevent the taxpayer from attributing the expense to fewer than all of his product categories since the R&D Regulation permits the aggregation of product categories for allocation purposes.

Complexity

Critics of the Regulation argue that the R&D Regulation is overly complex and lengthy. They state that assembling the data necessary to perform the allocation calculations is very time consuming and difficult. They question whether the additional revenue that might be collected under the Regulation is worth the expenditure of taxpayers' and the Federal Government's time and money in attempting to comply with and administer the Regulation. On the other hand, the R&D Regulation applies to few taxpayers. In 1976, for example, only 6,513 U.S. corporations claimed foreign tax credits. Moreover, much of the R&D Regulation's complexity arises from various options (such as the optional increase in exclusive place-of-performance allocation) that benefit the taxpayers that choose them.

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[50] *See* paragraph (g) of the Regulation, Example (6).

7. Sourcing of Royalty and License Payments

It has been proposed that U.S.-performed R&D expenses be deducted exclusively from U.S.-source income. On the other hand, royalty income from foreign affiliates attributable to this R&D is allocated exclusively to foreign sources. This mismatch in sourcing rules can lead to a double deduction for R&D expense as described above. If the proposal is adopted, this double deduction problem can be cured by treating all or part of royalty payments from foreign affiliates as U.S.-source income in situations where the parent deducts R&D exclusively from U.S.-source income. Such an approach could more accurately match income with the respective economic activities that give rise to that income. Of course, this approach would decrease the benefit to taxpayers of the proposed 100-percent allocation of U.S.-based R&D to U.S. income.

Senator BAUCUS. The hearing will come to order.

We all know that America faces a trade crisis marked by a huge trade deficit, declining productivity, and a reduced standard of living for the average American worker.

Under Chairman Bentsen's leadership, the Senate Finance Committee is attacking that crisis head-on. We soon expect to consider comprehensive legislation reforming our trade laws and helping our negotiators dismantle foreign trade barriers, but there are two additional steps that we must take. One is reducing the Federal budget deficit, which has undermined international economic stability; the other is restoring our good old-fashioned ability to compete in the world marketplace. That means addressing the basic elements of our economy, namely the cost of capital, the education of our children, the skills of our workers, and the inventiveness of our scientists and our engineers.

These changes depend primarily on the private sector, but they also depend in part on Federal policy. Research is a good example. Research is the lifeblood of economic progress. Technological improvements have accounted for two-thirds of our increased labor productivity since 1929.

Nine of the ten fastest growing U.S. industries are high tech industries, and high tech products account for more than 40 percent of our manufactured exports. At one time, we might have thought that Yankee ingenuity alone gave us an inimitable advantage in commercial research. I wish that were true, but it is not. The U.S. now spends proportionately less on civilian R&D than either France, Germany, Japan, or the U.K. Our high tech trade balance has fallen from a $27 billion surplus in 1980 to a $2.6 billion deficit in 1986. Last year, almost half of the new U.S. patents went to foreign inventors.

What is the Government's role?

It is well established that companies cannot recapture the full economic benefits that are generated by their R&D investments. So, unless we provide incentives, companies will underinvest. Our major trading partners recognize this and provide a wide array of incentives, including tax credits, expensing for investments in depreciable research equipment, and to cash grants.

In face of this, we Americans have two basic tools: first, the R&D credit, first enacted in 1981 and reauthorized in the Tax Reform Act. The credit is a critical element of our research and development policy. As Secretary Baldrige told this committee last year, the credit "encourages technological innovation" and "reaffirms our commitment to increasing the ability of American firms to compete in world markets."

Although the R&D credit was reauthorized in the Tax Reform Act, it was reduced from 25 percent to a 20 percent incremental rate; and it was only extended through the end of 1988.

The second tool is the allocation of domestic research expenses under Section 861. Treasury Department regulations provide that a portion of R&D domestic expenses of a company with overseas operations may have to be allocated against foreign income. This may be sound tax theory, but many foreign countries do not permit U.S. companies to take a corresponding deduction for that research.

As a result, the Treasury regulations have the practical effect of encouraging companies to shift R&D efforts overseas.

In 1981, 1984, and 1985, Congress enacted temporary moratoria against the regulations 'application and directed the Treasury to study the regulations' impact on domestic research. In the 1986 Tax Reform Act, we enacted an additional moratorium applied to 50 percent of research expenses. This partial moratorium expires in August.

Senator Danforth and I have introduced legislation to make the R&D credit permanent and restore the rate to 25 percent. It has been co-sponsored by six other members of the committee. Senator Wallop and I have introduced legislation that would permanently provide a 100 percent domestic research expense which may be allocated against domestic income. It has been co-sponsored by 11 other members of the Finance Committee.

In addition, the Administration has indicated its support. In his competitiveness initiative, President Reagan called for "legal and regulatory stability" regarding the R&D credit and the allocation of R&D expenditures.

Today's hearing is designed to address the relationship between tax policy and America's R&D capability.

Specifically, we will focus on the credit and on the Section 861 allocation. First, we will hear from Secretary Mentz, who will describe the Administration's position on these issues. Then, we will hear from two economists, Robert Eisner and Martin Baily, who will discuss the utility of tax incentives for research generally and the credit in particular.

Finally, we will hear from a panel of members from the industry.

Before I begin, however, I would like to again praise Senator Danforth and Senator Wallop for their leadership on these issues. I see also Senator Chafee is here, who has——

Senator CHAFEE. Gee, I was not there for a minute——

[Laughter.]

Senator BAUCUS. He is not a sponsor of either of these bills, but is certainly a long-time advocate of increasing America's competitive position.

Senator CHAFEE. Put me on them. [Laughter.]

Senator BAUCUS. With that, I will turn to my colleague, Senator Wallop. Do you have a statement?

Senator WALLOP. Mr. Chairman, thank you. I must say I have always appreciated your interest in the R&D tax incentives. I want to thank you for scheduling this hearing and for accommodating an issue that I have been pursusing for fully half of my time in the United States Senate, the Section 861 R&D allocation problem.

The problem first came to my attention in 1981 when Treasury promulgated regulations to require U.S. companies with overseas operations to allocate a portion of their domestic R&D expenditures to their income earned abroad.

By arbitrarily treating a portion of domestic R&D as if it were performed overseas, the U.S. became the only country in the industrialized world to oppose such an accounting fiction on its corporate structure. While foreign nations were actively seeking to attract R&D through various favorable governmental policies, the U.S. was effectively encouraging its export by virtue of the increased tax burden imposed by the 861 regulation.

In response to the absurdity, Congress imposed a two-year moratorium on the implementation of Section 861 R&D regulations in the 1981 tax bill. I proposed to make this moratorium permanent in 1983, but revenue constraints and other factors forced us to settle for yet another extension of the moratorium in the Deficit Reduction Act of 1984 and again in the Reconciliation Bill enacted in early 1986.

Subsequently, in the Tax Reform Act, we were successful in obtaining a partial moratorium that expires in August. In spite of the new deadline and that of my firm belief that a permanent solution to the 861 issue is long overdue, basically with the chairman of this subcommittee and 11 other members of the Finance Committee, we have introduced legislation to fully repeal the allocation of requirements on March 11. In so doing, Senator Baucus, Senator Danforth, and I recognized that, while our legislation represented the best and most correct answer, we might nonetheless be forced to compromise on a less than perfect solution to the revenue constraints.

It was with this in mind that we initiated discussions with the primary House sponsors of identical legislation, the Treasury, and the affected companies in search of an acceptable compromise proposal, and that was on March 18th.

I am pleased to report that such discussions have produced a tentative agreement on a proposal that has the support of both Treasury and industry. They feel it would permit companies to allocate 67 percent of domestic R&D to U.S. sources, and only the remaining 33 percent would be subject to allocations. It would provide that required allocations be computed pursuant to the formula provided for in the Tax Reform Act of 1986.

Computations would be done on a consolidated basis with the expressed warning that Section 936 companies are excluded.

It is my understanding that Treasury's testimony today will reflect the substance of this agreement. I really wish to compliment the Secretary, and particularly Assistant Secretary Mentz, for their support of this reasonable solution. Particularly, I want to thank you, Roger, for the serious pursuit of resolutions.

We have come a long way toward resolving the 861 problem. Let us not forget we have a distance to travel before any solution is enacted into law. Now, the necessary sources of revenue must be found, and this is no small task.

It is my hope that the Administration will be forthcoming with realistic proposals for our consideration in the near future. With the continued support of the President and with the cooperation of industry, I am reasonably confident that we can put this issue at last to rest this year.

Senator BAUCUS. Thank you, Senator. Senator Danforth?

Senator DANFORTH. I have no opening statement, Mr. Chairman. Thank you.

Senator BAUCUS. Senator Chafee?

Senator CHAFEE. I support the changes in the R&D allocation under Section 861. However I didn't join in cosponsoring the bill on the R&D credit because it increases the credit to 25% in addition to making it permanent. I am certainly for making it permanent, but increasing it to 25% is extremely costly. The permanency part I am all for. Thank you, Mr. Chairman.

Senator BAUCUS. With that, Secretary Mentz, you are on.

STATEMENT OF HON. J. ROGER MENTZ, ASSISTANT SECRETARY FOR TAX POLICY, U.S. DEPARTMENT OF THE TREASURY

Secretary MENTZ. Thank you, Mr. Chairman, and good morning. Good morning, Senator Wallop, Senator Danforth, Senator Chafee. It is a pleasure as always to appear before this committee. Today, I would like to present the views of the Administration on the tax credit for research and experimentation expenses—we call it R&E—and the rules for allocating and apportioning deductions for R&E between foreign and domestic source income, that Senator Wallop referred to.

The focus of this hearing today—private domestic research activities—is of critical importance to our nation's economic vitality. The Administration is determined to encourage continued growth in domestic research activities.

Technological innovation is essential to maintain our competitive position in the world economy. The Administration strongly believes that both the credit and the apportionment rules can properly serve to encourage domestic R&E.

The research credit is scheduled to expire at the end of 1988, and this subcommittee is considering a bill, S. 58, which would make the credit permanent and raise it from 20 to 25 percent. The Administration supports maintaining the credit for research expenses and we welcome this early opportunity to examine the appropriate structure, rate, and duration of the credit. Because it does not expire until the end of next year, I will not offer specific recommendations this morning with respect to the credit.

On 861-8, the rules contained in the Tax Reform Act on this subject modify the Treasury Regulations, and those rules will expire with taxable years beginning on or after August 1, 1987. As noted, there is a bill, S. 116, that was introduced that would provide that all R&E expenses attributable to activities conducted in the U.S. would be apportioned to income from U.S. sources. This bill would be retroactively effective for all taxable years beginning after August 1, 1986. And at the conclusion of my testimony, I will get to the Administration's proposal for allocation and apportionment rules for taxable years beginning after the expiration of the Tax Reform Act provision.

I think Senator Wallop has already summarized them, but I will get to them in a minute.

I would like to discuss very briefly the need for R&E tax incentives. I think it is an unusual case where it is appropriate for the tax law to provide special incentives. "Research" in ordinary usage encompasses a broad range of activities. It embraces basic research involving general scientific activities, rather than specific commercial objectives, and research for commercial product development.

Broad Government support is essential for basic research, which by its nature cannot be self-supporting. The Federal Government has traditionally taken a lead role in funding basic research, primarily through grants to universities and other nonprofit organizations.

Firms will invest in research to the point that the expected commercial returns are at least equal to those available from alternative investments when adjusted for risk. Although opportunities for commercial profit ordinarily allocate resources most efficiently, the return to the private investor may not reflect the true benefit to society. That is because sometimes it is possible for the product of research to become disseminated in the marketplace and others to take advantage of it; and therefore, the inventor doesn't get the full benefit of it. And so, it is a little bit different, and it needs to be treated differently from a Government policy standpoint.

In addition to the disparity between the private and social benefits of research—the societal benefits of research—he risk inherent in certain research activities may discourage firms from undertaking specific research projects.

As a result, the private sector may fail to invest adequately in desirable research activities. This is particularly true of basic research.

And there are a number of Government subsidies, as I indicated. The Government directly funds a substantial amount of research. As much as one-half of all R&E activities are directly funded by the Government. But there are important tax subsidies, or tax benefits, that flow out of the tax law that are directed to R&E. You all know Section 174, which allows taxpayers the ability to expense R&E expenses, rather than capitalize them, which would be the normal accounting rule.

And a second R&E provision is a five-year rapid amortization of property used for R&E. A third is the possessions tax credit; section 936 is an R&E benefit because it has the effect in some cases of allowing as much as half of the income from a product that is related to an R&E intangible to be exempt from U.S. tax.

A fourth incentive is the so-called university credit, the tax credit for corporate contributions to basic research.

The ones we are going to talk about this morning—the ones that are perhaps the most significant—are the incremental R&E tax credit, which is intended to encourage firms to increase their research activities each year, and second the rules for allocation and apportionment of expenses to foreign source income.

I will describe these rather briefly since we are somewhat limited by time, but——

Senator Baucus. Mr. Secretary, you can take the time you need. Why don't you take about seven or eight minutes?

Secretary Mentz. All right.

Senator Baucus. Ordinarily, we hold witnesses to five minutes, but why don't you take a little longer?

Secretary Mentz. Fine. As I said, the testimony lays out all the detail; and of course, it will be part of the record. As reflected in both your statement, Mr. Chairman, and Senator Wallop's statement, stability in the tax laws that encourage research is really very important, and the Administration is quite committed to it.

Stability allows taxpayers to undertake R&E with greater assurance of tax consequences, permitting them to establish and expand R&E facilities without the fear that the tax rules will suddenly change. Any R&E tax incentive has to encourage R&E in the United States. R&E in the United States, in contrast with U.S.

owned R&D facilities located abroad, promotes U.S. jobs and U.S. technology. So, that is a critical aspect of any tax incentive—any R&E tax incentive.

Let's start with the R&E credit. Current law allows a 20 percent tax credit for a portion of taxpayers' qualified research expenses. That credit is scheduled to expire at the end of 1988. The portion of the taxpayers' qualified research expenses that are eligible for the credit is limited to the lesser of the excess of those expenses in the current year over the average amount of such expenses for the prior three year base period or 50 percent of qualified research expenses. Thus, it is a credit for incremental R&E. You have got to keep moving up in order to get—from one year to the next—the benefit of the R&E.

The actual incentive supplied by this credit will vary among different taxpayers. For example, firms with temporarily declining research expenses will actually have a negative effective rate of credit. In other words, it will be an advantage for those firms to defer making R&E investment so that it does not get into their base period.

This is really not consistent with the basic philosophy of the credit, but it does happen in those cases where firms are experiencing, for some reason, a decline of their research activity.

For firms in the more common middle range with growth rates of R&E between zero and 100 percent, the credit in the current year provides a benefit of 20 cents for each dollar of increased R&E expenses. However, such a firm essentially pays back the major portion of this subsidy through reduced credits over the succeeding three years if it increases or maintains its level of research expenses.

In this case, the sole value of the credit arises essentially from the timing differences between the initial benefit and its subsequent payback. As a result, if a 10 percent discount rate is assumed, the effective rate of credit for each additional research dollar is not 20 percent but only about 3.4 percent. That is because the additional dollar, in addition to giving yov some credit in the current year, is going to make it tougher to get a credit in the next three years. So, it has that double-edged effect.

And for firms with growth rates of R&E in excess of 100 percent, the effective rate of the credit in the current year is 10 percent; and that is because of the 50 percent limitation.

There are a number of alternative structures that could be considered and, indeed, that we are thinking about. The National Science Foundation has a proposal, and there are others. And it is fair to say that none of the alternatives presents a perfect solution to the problems of the current credit. There are advantages and disadvantages to the current law structure and alternatives that are suggested in my testimony.

Although the incremental nature of the credit was adopted in order to reduce the revenue cost, while attempting to achieve a reasonably significant increase in R&E, it is not certain—at least not in our minds—that we have the structure—the optimal structure—for the current credit.

Because it is so important that relative efficiency of the current law structure and alternative proposals be fully analyzed, the Administration will continue to study this area.

We look forward to working with the subcommittee to improve this important provision in a revenue neutral manner.

I would like to move now to 861-8. 861-8 broadly deals with the allocation and apportionment of expenses to foreign income. It is important for a number of reasons, one beiog the computation of tax liability of foreign corporations that are engaged in business in the United States; but the most significant, certainly in terms of revenue and for this hearing today, is its effect on the foreign tax credit.

The foreign tax credit applies to U.S. persons who are subject to U.S. tax on worldwide income. Since income from sources outside the United States may also be subject to foreign tax, without some relief—some mechanism is needed to avoid what is known as international double taxation—the income could be subject to two taxes: foreign tax and U.S. tax; and that would be very noncompetitive and very unfair.

To prevent this possibility, our Internal Revenue Code has—since I believe 1918—permitted U.S. taxpayers to elect a credit against the U.S. income tax for foreign taxes paid to the foreign jurisdiction. But there is a limitation on the credit; the limitation is imposed because, if it were not imposed, if you didn't have a limitation, it would be possible that foreign taxes paid in a foreign jurisdiction could be available to offset U.S. tax that would otherwise be payable on U.S. income.

And if that situation were allowed to exist, that would mean that a corporation doing business abroad would have an advantage over a corporation that had no foreign operations. In other words, it is the subsidy of the foreign activity producing an excess credit which would come back and be available against U.S. tax, otherwise payable on U.S. source income, that our foreign tax credit limitation is designed to prevent.

The operation of the limitation depends upon correct determination of the U.S. taxpayer's foreign source taxable income under U.S. tax rules. Foreign source taxable income is determined by deducting from foreign source gross income, deductions properly allocated and apportioned to gross income.

The 861-8 regulations specify how a taxpayer's expenses—not just R&E but all kinds of expenses—are allocated and apportioned to produce the appropriate result.

They provide special rules for certain kinds of expenses, including R&E. A business normally wants to characterize as foreign source as high a proportion of its taxable income as possible to permit maximum utilization of the credit. However, on tax policy grounds, some apportionment to foreign source income is appropriate when domestic R&E is exploited in a foreign market and generates foreign as well as domestic income.

If this apportionment is not made, foreign source income will be too high, resulting in the offset by foreign taxes of the U.S. tax on U.S. source income. In other words, the purpose of the foreign tax credit limitation would be frustrated if these rules are not applied with some degree of integrity.

With regard to the R&E rules, our enforcement of R&E presents really the most difficult and unique problems in this whole area of 861-8. There are many types of production and a variety of locations for a manufacturer to benefit—the R&D can benefit a number of different projects that are not foreseeable at the time that the R&E is entered into.

Some products may benefit soon after the development of the use of the R&E, and others far into the future. Identifying specific contributions of the R&E expense to income in any particular segment is very inexact, and especially with regard to basic R&E, but R&E generally—it is speculative, and it proceeds often by trial and error.

R&E expenses often do not result in the manufacture of commercially viable products and, more often than other types of expenses, do not result in the production of any income. R&E that is unsuccessful, obviously, produces no income. So, it is really a very tough problem.

As I indicated, there are more conceptual difficulties in the allocation of R&E than any other expense. We have had a regulation out since 1977. There is a detailed discussion of it, which I am going to pass over, but I commit it to you for your reading pleasure.

Senator BAUCUS. Mr. Secretary, we have a vote going on right now, and I wonder if we might turn to a few questions. It is possible that we can wrap up the questions portion with you before we head off for the vote.

Secretary MENTZ. That would be fine.

Senator BAUCUS. I first want to thank you for your efforts on section 861. I know that you have spent a lot of time with industry and with members of Congress and with others in the Administration to try to develop a workable solution. The solution that you and Senator Wallop have alluded to is one that I think we can work with and makes sense. And I just personally want to thank you for you efforts.

One question I have is about smaller businesses and the availability of the credit. A lot of small businesses starting up have a difficult time getting the credit because they are not considered to be in the trade or business. I am curious as to whether you have any suggestions as to how we could modify the tax credit in a way that does not allow abuses—abusive shelters, for example—but still helps startups.

Secretary MENTZ. There are two problems with the credit. One is the one you alluded to, that if they are not quite in business yet, they don't get it. But even beyond that, you have got to have tax liability; and many startup businesses are not in a taxable position right away. Unless you want to make the credit refundable, which I don't think we would advocate—at least not at this point—I think that is simply a limitation on the ability to use the credit as a meaningful for incentive. However, there is data at the back of my testimony which indicates that certainly more so than the allocation and apportionment of expenses, the R&E credit does reach down into some of your smaller businesses.

Some of the smaller businesses are ones that are able to take advantage and utilize the credit. So, I am not sure I have a very good answer to your specific question, Mr. Chairman, other than to say that I think to some extent it is already in place and working right now.

Senator BAUCUS. Does a larger business that enters a new line—a new operation—is a larger company able to take advantage of the credit with that new line, even though that new line is not probably yet a trade or business?

Secretary MENTZ. When you are in a trade or business, I think the basic rule is as you stated it. And perhaps that is a modification that we ought to think about. Make it like Section 174; Section 174 does not require the taxpayer to be in a trade or business in order to get the 174 deduction.

Senator BAUCUS. It is something that I think we have to look at.

Secretary MENTZ. I think that is a worthwhile suggestion.

Senator BAUCUS. Senator Wallop?

Senator WALLOP. I have one question that is combined with a thought that I just elicited out of your testimony. The question is: What is Treasury's justification for putting R&D differently than any other expense under the allocation regulations? And I heard you say—I thought—that a lot of times R&E doesn't result in any income at all. That is exactly the purpose of R&D: to find those things which can or which cannot. It strikes me as a peculiar sort of measurement, that it has to produce income. I don't know how you would know before you start that it is going to.

Secretary MENTZ. I said that just to illustrate just how difficult a problem it is. Some R&E doesn't produce income; other R&E is going to be very productive of income and may produce a lot of foreign source income. And since we are on an annual tax accounting basis, you have to deal with expenses year by year by year. So, I think that is one of the reasons why a regulatory approach to 861 R&E just hasn't really been successful, and that is why the Administration, with your encouragement and support, agrees that a statutory solution—permanent statutory solution—is the right answer.

By the way, just one qualification. I am not quite sure we have got the 936 problem worked out. We are looking at it; we are not quite clear as to how 936 fits in with the statutory 861-8 rule, but we are working with industry, and we will get that problem solved, Senator. But I just wanted to caution that it wasn't quite tied down yet.

Senator WALLOP. Don't make me hold my breath. [Laughter.]

Thank you, Mr. Chairman.

Senator BAUCUS. Senator Danforth?

Senator DANFORTH. Mr. Secretary, the R&D credit has been in the Tax Code now since 1981. Previously at hearings on the subject, witnesses have testified that some degree of certainty or stability or predictability would be very helpful, that business commitments made to research and development are not made on a two or three-year timetable, but more like seven or eight years. Don't you think that we are getting to the point, after six years of fussing around with the R&D credit, that we are in a position to determine what the future is and put something on the books?

Secretary MENTZ. I absolutely agree with you, Senator Danforth, that the R&D credit is something we ought to get as a permanent part of the tax law and not a year-to-year, temporary bandaid kind of solution. I an just concerned—and after having looked at it fairly intensively in preparation for this hearing—I am concerned that maybe the current credit isn't exactly the right answer because of the strange scenario where you can actually have a disincentive in the current credit, in particular fact patterns; and maybe we can come up with a better answer.

But whatever the answer is—and the Administration is certainly prepared to fund it, spend money on it—it is just that I am not clear that the current law credit is exactly the right answer. I totally agree with you as to the necessity for a permanent solution.

Senator DANFORTH. I have a parental interest in the R&D credit, but not to the point of being totally inflexible. I do think that at some point in time, the debate just has to come to an end, and we have to decide what we are going to do. This business of constantly sunsetting is a problem. The previous position of the Administration was, well, we don't want it to be extended for the future.

Secretary MENTZ. That is certainly not our position now. Our position is quite the opposite. We want it to be permanent.

Senator BAUCUS. Is it permanently permanent? [Laughter.]

Secretary Mentz; Permanent. Absolutely.

Senator BAUCUS. That is good to hear.

Senator DANFORTH. Also, Mr. Secretary, you did say in your testimony that, in your opinion, this is one area where tax incentives do make sense. I know we are now on the second vote, and I don't want to detain you; but I would appreciate any comments you might want to submit to the committee in writing as to why you feel that this is one area where tax incentives are particularly appropriate; or you might be able to do it in a minute right now.

Secretary MENTZ. Part of the testimony addresses it, but basically, because first of all R&E is so speculative—it may be productive; it may not be productive—and if it is productive, our patent laws are not perfect. If it is computer software, it is possible that you may find a copy of it.

And because the intellectual property protection isn't perfect, it means that the free market actually works to discourage the inventor—the producer of the product of the R&E—and without some Government support, you are likely to underinvest in R&E. Now, you can do it by Government grant; and indeed, as I said, there is a lot of R&E that is federally funded; but to get commercial/industrial R&E, probably the best way to encourage it is a tax incentive.

I know that it is a little different feeling as opposed to where we were in last year's tax reform, but in last year's tax reform we certainly included some incentives. This is one, and we think it is appropriate.

Senator DANFORTH. Thank you very much. I only hope that in the very near future you and we and interested people in the business and the academic communities who really have a concern for the credit sit down together and make some decisions as to where we are going.

Secretary MENTZ. We would be very interested in doing that.

Senator DANFORTH. And I really would hope that the Administration would solicit input from people who are actually out there in the field and also those of us in Congress who have been wrestling with it, rather than sitting in the Treasury and trying to work it all out.

Secretary **Mentz**. As I think you know, that is exactly what we did on the 861-8. That really is our track record, and I hope that we would certainly do the same thing. I am just not smart enough to sit in an ivory tower and figure it all out myself.

Senator **Danforth**. Yes, and you know where to find my phone number.

Secretary **Mentz**. I know it by heart, Senator. [Laughter.]

Senator **Baucus**. Thank you very much, Senator. I think, incidentally, that is a very good idea. I would take the work on section 861 as an example for approaching these issues—not only the permanence of the credit but also the specific provisions of the credit.

I have a hunch that it is going to happen. That is, Senator Danforth, Senator Wallop, and myself will meet with you and the industry so we can put that together.

Secretary **Mentz**. That is fine.

Senator **Baucus**. Thank you very much, Mr. Secretary.

Secretary **Mentz**. Thank you, Mr. Chairman.

Senator **Baucus**. The hearing will recess for about 10 minutes.

[Whereupon, at 10:15 a.m., the hearing was recessed.]

AFTER RECESS

Senator **Baucus**. The hearing will come back to order. Before we go to the next panel, I would like to mention to Secretary Mentz that the chairman has indicated he may want to come over to ask a few questions of the Secretary, but we are unsure yet whether the chairman is in fact going to come over. We are trying to determine an answer to that question right now; so, I am wondering, Mr. Secretary, if you could wait a few minutes until we determine the answer to that question.

Secretary **Mentz**. Sure.

Senator **Baucus**. Let's proceed now to our panel. Our panel is Professor Robert Eisner from Northwestern University and Dr. Martin Baily, Senior Fellow at the Brookings Institution. Would you two gentlemen please come forward?

Does anyone know where Mr. Eisner is?

[No response.]

Senator **Baucus**. Thank you. All right. While we are waiting for Professor Eisner, let me just explain what the purpose of this panel is. There are some very good, basic questions that several people are asking about the R&D tax credit as well as the Section 861 allocation.

With respect to the credit, there are some who think that the credit is absolutely necessary to provide sufficient incentives for American firms to engage in sufficient R&D to increase our technological advantage or to even gain an advantage in many areas. There are others who say that the R&D tax credit is not really necessary, that firms are going to conduct that business anyway—conduct that research anyway.

The argument goes that in order to compete in this competitive world today, firms are going to have to spend the dollars on research and development, and the credit really is just an unnecessary giveaway.

So, it is our hope that the two panelists, Professor Eisner and Dr. Baily, will help shed some light on this. Professor Eisner, why don't you begin because I know you have some very serious reservations about the credit; and why don't you tell us what they are? And when you are finished, Dr. Baily will then explain just why he thinks the credit is a good idea.

Professor Eisner. Right.

[The prepared written statement of Secretary Mentz follows:]

For Release Upon Delivery
Expected at 9:30 a.m., E.S.T.
April 3, 1987

STATEMENT OF
THE HONORABLE J. ROGER MENTZ
ASSISTANT SECRETARY (TAX POLICY)
DEPARTMENT OF THE TREASURY
BEFORE THE
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT
UNITED STATES SENATE COMMITTEE ON FINANCE

Mr. Chairman and Members of the Subcommittee:

I am pleased to have the opportunity to present the views of the Administration on the tax credit for research and experimentation ("R&E") expenses and the rules for allocating and apportioning deductions for R&E between foreign and domestic source income. The focus of this hearing today -- private, domestic research activities -- is of critical importance to our nation's economic vitality. The Administration is determined to encourage continued growth in domestic research activity. Technological innovation is essential to maintain our competitive position in the world economy. The Administration strongly believes that both the credit and the apportionment rules can properly serve to encourage domestic R&E.

The research credit is scheduled to expire at the end of 1988 and this Subcommittee is considering a bill, S. 58, which would make the credit permanent and raise the rate from 20 percent to 25 percent. The Administration supports maintaining a tax credit for research expenses and we welcome this early opportunity to examine the appropriate structure, rate and duration of the credit. Because the credit does not expire until the end of next year, however, we will not offer specific recommendations with respect to the credit at the current time.

The rules contained in the Tax Reform Act of 1986 ("TRA") for allocation and apportionment of R&E expenses, which modify the rules in section 1.861-8 of the Treasury Regulations ("the Regulation"), expire with taxable years beginning on or after August 1, 1987. A bill, S. 116, has been introduced which would provide that all R&E expenses attributable to activities conducted in the United States would be apportioned to income from U.S. sources. This bill would be retroactively effective for all taxable years beginning after August 1, 1986. At the conclusion of my testimony, I will set out the Administration's proposal for allocation and apportionment rules for taxable years beginning after the expiration of the TRA provision.

I. The Need for R&E Tax Incentives

A. Rationale for Government Support of R&E

The term "research" in ordinary usage encompasses a broad range of activities. It embraces both basic research activity involving general scientific, rather than specific commercial objectives, and research activities for commercial product development.

Broad government support is essential for basic research, which by its nature cannot be self-supporting. Although scientific and technological advances from basic research may eventually prove to have commercial applications, such applications are typically too remote to permit private investors profitably to support such research. For this reason, the Federal government has traditionally taken a lead role in funding basic research, primarily through grants to universities and other non-profit organizations.

Firms will invest in research to the point that the expected commercial returns are at least equal to those available from alternative investments, when adjusted for risk. Although opportunities for commercial profit ordinarily allocate resources most efficiently, the return to the private investor from research expenditures may not reflect the true benefit to society. In many instances, it is not possible (or desirable) to prevent the dissemination of technological knowledge, even though it is proprietary information. If a business invents a new type of product, imitators will appear and attempt to share the profits from this innovation. This can occur in many cases even though a business obtains a patent for a new product or attempts to keep an innovative process secret. To the extent the societal benefits from technological innovation are not fully reflected in the investor's return, businesses will spend less than optimal amounts for research. Where market rewards for research expenditures do not match society's need for technological innovation, government appropriately should supply an additional incentive.

In addition to the disparity between the private and social benefits of research, the risk inherent in certain research activities may discourage firms from undertaking specific research projects. As a result, the private sector may fail to invest adequately in desirable research activities. This is especially true of basic research, as opposed to product development activities.

B. Government Subsidies for Research

Government supports research in a variety of ways. As shown in Table 1, the Federal government funds approximately one-half of all research and development activities. Total government support of research totaled $52.1 billion in 1986. Over 60 percent of this federally-sponsored research is for defense. While security considerations often necessitate government funding of defense research, direct funding of non-defense research, while overcoming the market bias for too little research, may misallocate such funds. This is true because the government cannot allocate such resources as efficiently as the free market.

The government also encourages research through indirect means, such as grants to universities and other non-profit organizations for education and training programs. In 1986, the Federal government spent about $15 billion to fund such programs. This type of support for research activities is important because research is, by its nature, labor intensive. For example, tax data for 1983 show that nearly 70 percent of qualified R&E expenditures were spent on wages and salaries. These data demonstrate the importance of government funding to provide an educated labor force to perform private research.

Another important indirect form of government support of research is through the tax laws. Tax benefits for R&E may in many cases be the most straightforward way of providing a government subsidy because, unlike research funded by direct grants, the distribution of tax benefits, such as a tax credit, depends on market forces. In comparing the level of indirect benefits provided through the tax system with direct Federal outlays, it should be recognized that tax benefits are measured in after-tax dollars, while outlays are in pre-tax dollars. Thus, for example, a 30 percent direct subsidy (taxed at a 34 percent tax rate) is approximately equivalent to a 20 percent tax credit. A disadvantage of using the tax system, however, is that many taxpayers may not have sufficient taxable income to utilize the intended benefits.

C. Tax Incentives for Research

The Internal Revenue Code contains several provisions designed to encourage investment in R&E. Section 174 of the Code allows taxpayers to expense currently, rather than capitalize, all qualified R&E expenditures. Because the income (if any) generated from current research is typically first earned sometime after the research is performed, and is spread over several years, a proper matching of revenues and expenses would require capitalization of R&E, with the capitalized amounts amortized over the period the income is earned. Because it is difficult to determine the appropriate amortization period, and because Congress wished to encourage R&E, however, these expenses are permitted to be deducted currently.

A second tax provision that is designed to encourage research provides that property used for R&E purposes can be depreciated over five years using the accelerated double declining balance method, without regard to its normal depreciation period. A third incentive is the possessions tax credit, which can function to exempt approximately half the income attributable to an intangible produced by R&E expenses. A fourth incentive is the tax credit for corporate contributions to fund basic research.

A fifth tax incentive for research is the incremental R&E tax credit which is intended to encourage firms to increase their research activities each year. A sixth incentive for research is the rule in the TRA permitting an exclusive apportionment of 50 percent of a taxpayer's research expenses to U.S. source income and the option to apportion remaining expenses on the basis of relative amounts of U.S. and foreign source gross income. The tax credit and the apportionment rule are the focus of this hearing today and I will describe, in detail, the current law with respect to these incentives and also set forth a legislative proposal for a new apportionment rule.*

D. Criteria for Evaluating R&E Incentive

The Administration is committed to providing stable tax laws which encourage research. Stability allows taxpayers to undertake R&E with greater assurance of tax consequences, permitting them to establish and expand R&E facilities without the fear that tax rules will suddenly change. It is, of course, appropriate to review periodically tax incentives to determine whether they are working as desired, or whether they can be improved. In addition, both the degree to which the provision provides the greatest incentive impact for each dollar of revenue cost and the availability of the benefits to all firms that perform R&E should be examined. Any R&E tax incentive must also encourage R&E in the United States. R&E in the United States, in contrast with with U.S.-owned R&E facilities located abroad, promotes jobs in U.S. technology. Tax incentives that satisfy these criteria will encourage technological innovation and enhance America's competitiveness.

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* As indicated in Table 5, the beneficiaries of the credit account for between 34 and 35 percent of all U.S. corporate sales and assets; beneficiaries of the R&E allocation rule account for 16 percent. Companies with assets greater than $5.0 billion account for 37.1 percent of the revenue cost of R&E credits and 60.2 percent of the revenue cost of the R&E allocation rule. Among large companies, 124 received an R&E credit in 1983; 46 are affected by the TRA R&E allocation rule.

II. The Research and Experimentation Credit

A. Current Law

Under current law, a 20 percent tax credit is allowed for a certain portion of a taxpayer's "qualified research expenses." This credit is scheduled to expire on December 31, 1988. The portion of a taxpayer's qualified research expenses that are eligible for the credit is limited to the lesser of (1) the excess of such expenses in the current year over the average amount of such expenses for the prior three-year period (the "base amount"), or (2) 50 percent of qualified research expenses in the current year.

The R&E credit is aggregated with certain other business credits and subject to a limitation based on tax liability. The sum of these credits may reduce the first $25,000 of regular tax liability without limitation, but may offset only 75 percent of any additional tax liability. Taxpayers may carry credits not usable in the current year back three years and forward fifteen. In addition, taxpayers liable for the alternative minimum tax cannot claim any tax credits, including the R&E credit.

Prior to the TRA, an expense was eligible for the credit if the amount was a "research or experimental expenditure" under section 174. Because Congress was concerned that section 174 does not define qualifying expenses with sufficient precision, a separate definition of qualified research was adopted for purposes of the credit as part of the TRA. Under the new definition, research must involve a process of experimentation undertaken to discover technological information which is intended to be useful in the development of a new or improved product or process. For this purpose, a process of experimentation entails the evaluation of multiple alternatives where the means of achieving the desired result is uncertain. In addition, the research must relate to a functional aspect of a new or improved product or process, and not to style, cosmetic or seasonal design factors.

The credit definition of qualifying research also excludes certain types of costs. Specifically, activities undertaken after the beginning of commercial production, adapting an existing product to the needs of a particular customer, duplicating an existing product of another taxpayer, or marketing and management activities are not eligible for the credit. The new definition also generally excludes the development of software for internal use, except to the extent provided in regulations. Finally, as under prior law, the credit is not available for research conducted outside the United States, in the social sciences, arts or humanities, or funded by any grant, contract or otherwise, as well as any costs associated with ascertaining the existence, location, extent or quality of any deposit of ore, other minerals, or oil and gas.

B. Experience with the Current Credit

The Treasury Department has available tax return data on the R&E credit for the period from 1981 through 1983 (and preliminary data for 1984). The data are set forth in detail in the attached tables, and I would like to discuss briefly a few of the highlights of these tables. Such data, however, cannot provide direct evidence whether the credit is truly an effective incentive for taxpayers to increase R&E expenditures. Rather, the data only indicate the R&E expenditures reported by the taxpayer, and not the amounts that might have been spent in the absence of the credit.

1. Increase in Reported R&E Expenses

Table 1 shows the 1981-1983 levels of qualifying R&E expenditures and the resulting R&E credits earned by corporate taxpayers claiming a credit. It also shows the growth in total company funded and Federally funded research and development, as compiled by the Bureau of the Census for the National Science Foundation ("NSF"). As noted in the Table, a 16.1 percent annual growth rate in research and development expenses was reported by the NSF for 1981, while a 40.4 percent growth in qualifying R&E over the base amount was reported on 1981 tax returns. This growth in qualified R&E expenses as reported to the Internal Revenue Service, which applies only for firms with positive rates of growth,* cannot be directly compared with the 16.1 percent 1981 annual growth rate in research and development because the NSF figure included firms with both positive and negative rates of growth. Even when only positive growth rate firms are examined, however, the financial accounting data reveal a 21 percent growth rate for 1981 in company funded research and development, or about one-half of the growth in R&E noted from the tax data.

The disparity between these rates of growth may be due to the fact that those research expenditures that qualify for the R&E credit grew at a faster rate than the non-qualifying expenditures, or it may mean that, upon the availability of the credit, firms reclassified for tax purposes some expenses which they had not previously recorded as qualifying R&E expenses for financial accounting or other purposes. The Table also shows that the rapid growth of qualifying R&E over the base amount continued in 1982 and 1983.

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* Only firms with positive rates of growth report to the Internal Revenue Service because these are the firms claiming the credit.

2. Distribution of R&E Expenditures and Credits

Table 2 presents the distribution of R&E expenditures and R&E tax credits by firm size for firms claiming the credit. The Table illustrates that although R&E is performed by firms of all sizes, such activity is heavily concentrated among a relatively small fraction of large firms. As also shown in Table 2, the distribution of the R&E credit by firm size reflects the general distribution of R&E activity. However, the very small firms actually earn a disproportionately greater amount of credit per dollar of research performed (although, as I shall discuss further, they may not be able to utilize it fully).

Tables 3A through 3C indicate the distribution of R&E and the credit claimed by industry in the years 1981 through 1983. They show that the corporations performing most of the R&E, and claiming most of the credit, were concentrated in several major industries. Corporations in six industry categories -- petroleum refining, chemicals and rubber, machinery (both electrical and non-electrical), motor vehicles, transportation equipment, and transportation, communications and utilities -- accounted for more than three-fourths of qualifying research expenditures in these years.

Table 4 shows the 1983 distribution of the R&E performed and the tentative credit for firms with various rates of growth in R&E over their base amount. While it is apparent that most of the R&E was performed by firms with near average growth rates (20 to 60 percent), a significant fraction (approximately eight percent) of total R&E was performed by firms with R&E growth rates in excess of 100 percent of their base amount. As shown in this Table, such firms tend to be relatively small, whether measured by asset size or by the magnitude of the R&E performed.

3. Utilization of the Credit

The actual incentive supplied by the credit will vary among different taxpayers. The credit will be of maximum value only to those taxpayers which have a current tax liability or prior tax liabilities against which the credit could be carried back. Figure 1 illustrates the disparity between the credit available, the credit earned, and the credit claimed. The credit available includes both the credit earned in the current year and all applicable carryforwards from prior years. The credit claimed is generally less than the available credit because many taxpayers may not have adequate taxable income in the current year or prior years to take full advantage of the credit. By 1983, the credit claimed was less than one-half the total available credits. Because an unknown portion of the credit earned may in fact be carried back to prior years, the actual benefits may be somewhat greater than this statistic suggests. Nevertheless, any unused credits generate only a reduced incentive to expand R&E. For example, even a delay of one year in applying the current credit could reduce its incentive significantly due to the time value of money.

C. Revenue Estimates

Any extension of the R&E credit, either in its current or modified form, must occur only in a revenue neutral manner. I should stress here that we should -- indeed must -- not proceed with changes to either the credit until we are able to do so in a way that does not exacerbate the Federal budget deficit.

The research credit was added to the Code in the middle of calendar year 1981. From that time through the end of 1988, when the current credit is scheduled to expire, we estimate that the credit will cost the Treasury Department approximately $8.1 billion. Over the six year period from 1987 to 1992, the cost of making the current credit permanent is $4.6 billion and raising the rate from 20 to 25 percent would cost an additional $1.1 billion. Over the same six year period, the cost of a three-year extension at a 20 percent credit rate would be $3.9 billion.

D. Evaluating the Research Credit Against the Criteria

The current law credit satisfies several of the desired criteria for an R&E tax incentive. The R&E credit is available only for domestic research, and thus its incentive effect is directed exclusively at encouraging R&E in the United States. In addition, it tends to spread the benefits over a wide range of R&E performing firms, especially the smaller and more rapidly growing firms.

In this era of budgetary constraints, however, it is essential that the credit be structured in the most efficient manner possible, and here the adequacy of the current law credit may be questioned. The efficiency of any R&E credit depends in part on two factors: the extent to which the tax credit reduces the after-tax cost of the last dollar of R&E, the responsiveness of firms' R&E to that cost reduction.

The percentage reduction in the after-tax marginal cost of research may be characterized as the effective rate of credit. For example, in the case of a flat rate credit, such as the recently-repealed investment tax credit, the after-tax cost of a qualifying investment was reduced by a percentage equal to the statutory credit rate. Thus, for the investment tax credit, the effective rate of credit equaled the statutory rate (assuming that the firm could utilize the credit).

The response of a firm to the reduced cost of R&E is referred to as the firm's price elasticity of demand for R&E. Economists are uncertain regarding the average price elasticity of R&E, but the few estimates that do exist suggest that the value is about one-third. This value implies that the expected percentage increase in R&E is about one-third the effective credit rate.

The current research credit yields an effective rate of credit which is a fraction of the statutory rate. The actual effective rate of credit under current law varies substantially among firms depending on their rate of growth in qualifying research expenses. This difference can be analyzed by dividing firms into three categories: (i) those with current R&E temporarily below their base amount; (ii) those with rates of growth in R&E above their base amount between zero and 100 percent; and (iii) those with rates of growth in R&E above their base amount greater than 100 percent. Examples illustrating the calculation of the effective credit rate in each of these cases, and an example illustrating the impact on the effective credit rate of the inability to currently utilize the credit, are provided in the Appendix.

Firms with temporarily declining research expenses actually have a negative effective rate of credit (i.e., they are encouraged to postpone their R&E spending) because the calculation of their base period amount for future years depends on the level of current expenditures, thereby reducing the amount of the credit available in future years. Thus, a firm that cannot claim the credit currently can increase its future credits by delaying its research expenditures.

For firms in the middle range, with growth rates between zero and 100 percent over their base amount, the research credit provides a tax benefit of 20 cents in the current year for each dollar of increased research expenditures. Such a firm, however, effectively "pays back" the major portion of this subsidy through reduced credits over the succeeding three years if it increases or maintains its level of research expenses. In this case, the sole value of the credit arises essentially from the timing differences between the initial benefit and its subsequent payback. As a result, if a 10 percent discount rate is assumed, the effective rate of credit for each additional research dollar is not 20 percent, but instead approximately 3.4 percent.

For firms with growth rates in excess of 100 percent over their base amount, the effective rate of credit would be 10 percent, if such firms were to sustain such high rates of growth in R&E (which is unlikely). If not, the effective rate of credit would be significantly reduced, and may even become negative.

The current research credit rewards those taxpayers who are expanding their research efforts. In an inflationary environment, a portion of such increases in expenditures may result from cost increases due to inflation, rather than from an increase in the real level of research activity. Indexing a taxpayer's base period expenses for inflation would result in a subsidy only for real increases in research expenses. The failure to index base period expenses for inflation also creates uncertainty over the revenue cost of the credit because the cost changes significantly with the rate of inflation. For example, with the current research credit, a one percent increase in the rate of inflation above the level assumed for revenue estimating purposes will result in an increase of approximately $100 million in the annual revenue cost.

E. Alternative Structures for the R&E Credit

A number of alternatives to the current research credit have been suggested. None of these alternatives to the current research credit, however, presents a perfect solution to the problems of the current law credit.

The simplest structure would be a credit equal to a fixed percentage of all research expenses. The rate of such a credit could be set so that the revenue cost is the same as the current incremental credit. Besides simplicity, a "flat rate" credit has several advantages over the current law credit. Unlike the incremental credit, a flat rate credit will never provide a negative incentive, and for many taxpayers would, in fact, provide a greater incentive per dollar reduction in tax revenues. Moreover, its revenue costs and incentive effects are less sensitive to the rate of inflation than the current law credit. The disadvantage of a flat rate credit is that a more carefully designed incremental credit can provide both a higher statutory and effective rate of credit at the same revenue cost. This is true because an incremental credit would apply only to a portion of a taxpayer's research expenses.

The ability to establish a higher statutory credit rate for a given amount of revenue loss is frequently considered the primary advantage of an incremental credit. Because the effective rate of credit of an incremental credit whose base reflects the firm's past R&E is less than the statutory rate, however, the incentive effect of such an incremental credit is often less than anticipated.

In order to achieve the greater efficiency possible with an incremental credit, the base amount might be fixed at the average value of the firm's historical level of R&E and thereafter be indexed by a factor unrelated to the firm's R&E activity. One such proposal calls for indexing a historical base period amount by the rate of inflation. Alternative exogenous factors, such as the rate of growth of the gross national product or the aggregate rate of growth of research, could also be used as indices.

The principal advantage of an incremental credit whose base amount is set at a historical level and indexed by an exogenous factor is that annual increases in research would not have negative incentive effects in subsequent years. Current evidence suggests that such a structure may raise the overall incentive effect for firms able to utilize the credit. Even with this structure, however, taxpayers with faster growth in R&E would continue to receive disproportionately greater potential benefits than slower growing firms. As noted, however, these faster growing firms may not actually be able to utilize fully the credit earned under current law. Moreover, the historical base may become less relevant over time, due to corporate acquisitions, mergers and other factors.

In addition, if the index were to grow more slowly than R&E, such a credit eventually would approach a "flat rate" credit, as the base period amount for most taxpayers would tend to be a small fraction of their R&E expense. If the revenue cost of such a credit were to be the same over a given period as the current law credit, its statutory rate would have to be less than that of the current law credit. Conversely, if the index were to grow more rapidly than R&E, over time fewer taxpayer would qualify for the credit. A careful choice of the index would thus be critical to any such proposal.

F. Conclusion

In summary, there are advantages and disadvantages to both the structure of the current law credit and all of the alternatives that have been suggested. Although the incremental nature of the current law credit was adopted in order to reduce the revenue cost, while attempting to achieve a reasonably significant increase in R&E, it is not certain that the structure of the current credit is optimal. Because it is important that the relative efficiency of the current law structure and alternative proposals be fully analyzed before any decision is make to stabilize the existing credit, the Administration will continue to study this area. In this regard, we look forward to working with the Subcommittee to improve this important provision in a revenue neutral manner.

III. Allocation and Apportionment Rules for Research and Experimentation

The allocation and apportionment rules for R&E expenses are important for several tax purposes, such as the determination of the U.S. tax liability of a foreign corporation with a U.S. trade or business. They are of paramount importance, however, in the context of the foreign tax credit limitation.

A. The Foreign Tax Credit and its Limitation

U.S. persons, including U.S. resident aliens, are subject to U.S. tax on their worldwide income. Income earned by a U.S. taxpayer from sources outside the United States may also be subject to tax in the country in which it is derived. Absent some relief, such income could thus be subject to double taxation by the source (foreign) and residence (United States) countries. To prevent this possibility, the Internal Revenue Code permits U.S. taxpayers to elect to credit against their U.S. income tax the foreign income taxes paid to a foreign government. In allowing a foreign tax credit for such foreign taxes paid on foreign income, the United States cedes primary taxing jurisdiction on that foreign source income to the source country.

The Code limits the foreign tax credit to the amount of the U.S. tax that would be imposed, if no credit were allowed, on the foreign source taxable income, measured by U.S. tax accounting rules. The objective of this limitation (the "foreign tax credit limitation") is to ensure that the foreign tax credit offsets U.S. tax on only foreign source income and not on U.S. source income. This objective is in turn important because the United States intends to cede taxing jurisdiction to the source country only with respect to foreign source income.

Mechanically, the foreign tax credit limitation is calculated by multiplying the taxpayer's tentative U.S. tax, before credits, by a fraction, the numerator of which is foreign source taxable income and the denominator of which is worldwide taxable income. For example, assume a calendar year corporate taxpayer has foreign source gross income of $200 million and U.S. source gross income of $200 million in 1987. The taxpayer has $100 million of deductions apportioned to U.S. source gross income and $100 million of deductions apportioned to foreign source gross income; it therefore has $100 million of U.S. source taxable income and $100 million of foreign source taxable income. The foreign tax credit allowed is limited to $40 million, the U.S. tax that would be imposed on the $100 million of foreign source taxable income before credits. If foreign taxes were $60 million, still only $40 million would be creditable in 1987. Assume, however, that $50 million of the deductions apportioned to foreign source gross income were misapportioned to U.S. source gross income, so that the taxpayer would have $150 million of deductions apportioned to U.S. source gross income and $50 million of deductions apportioned to foreign source gross income. The taxpayer would therefore have $50 million of U.S. source taxable income (instead of the correct amount of $100 million) and $150 million of foreign source taxable income (instead of the correct amount of $100 million). In that case the foreign tax credit would be limited to $60 million ($150 million times 40 percent), not $40 million, so that the misapportionment of the deductions would permit $20 million of foreign taxes to offset U.S. tax on U.S. source income. The misapportionment would thus give this company an advantage over a U.S. company that operates only domestically and incurs no foreign taxes that could offset U.S. tax liability.

The operation of the foreign tax credit limitation thus depends upon the correct determination of the U.S. taxpayer's foreign source taxable income under U.S. tax rules. Foreign source taxable income is determined by deducting from foreign source gross income deductions properly allocated and apportioned to the gross income. The Regulation specifies how a U.S. taxpayer's expenses are to be allocated among classes of gross income (such as retail sales income or royalty income) and then apportioned between U.S. and foreign source income within each class. The Regulation provides special rules for certain kinds of expenses, including R&E expenses.

Because foreign taxes in excess of the foreign tax credit limitation ("excess credits") for a taxable year are not allowed as credits in that year, a business normally wants to characterize as foreign source as high a proportion of its taxable income as possible. (Excess credits may be carried back two years and forward five years.) Any allocation of deductions to foreign source income reduces the proportion of foreign source taxable income and thus the amount of foreign taxes that may be credited against U.S. tax. Such an allocation has, in the case of companies with excess foreign tax credits, the same effect as the loss of a deduction in computing U.S. taxable income.

On tax policy grounds, some apportionment to foreign source income is appropriate when domestic R&E is exploited in a foreign market and generates foreign, as well as domestic, income. If this apportionment is not made, foreign source income will be too high, resulting in the offset by foreign taxes of U.S. tax on U.S. source income. The importance of avoiding this offset lies in the following. The foreign tax credit limitation -- whose purpose is to prevent the offset by foreign taxes of U.S. tax on U.S. source -- and the allocation and apportionment rules which figure so prominently in its calculation constitute the method by which the United States stakes out and protects the territorial limits of its tax base. To the extent the United States misapplies those rules, it permits and indeed encourages foreign governments to raise taxes at the expense of the U.S. Treasury.

To illustrate this point, consider the following. The apportionment of any domestically incurred expense, including R&E expense, to foreign source income will reduce foreign source taxable income and thus reduce the foreign tax credit limitation. If the foreign government does not allow the apportioned expense as a deduction, income taxes actually paid to the foreign government will not be reduced. Consequently, the apportionment will increase a taxpayer's total tax liability if it is in an excess foreign tax credit position, that is, if its foreign taxes exceed its foreign source taxable income multiplied by the U.S. tax rate on that income.

U.S. taxpayers can legitimately complain when a foreign government refuses to recognize an R&E deduction even though related to income produced, and taxed, in that country. If the United States were to alter its tax rules to apportion the expense disallowed by the foreign government to U.S. income rather than the foreign income generated by the expense, the

United States would reduce the taxpayer's overall tax liability. But the United States would do this only by increasing the amount of foreign tax credits that could offset the taxpayer's U.S. tax liability and, in particular, by permitting foreign taxes to offset U.S. tax on U.S. source income. The taxpayer's U.S. tax liability would be reduced through the foreign tax credit offset; but the taxpayer's liability to the foreign government, based as it would be on the improper disallowance by the foreign government of a deduction related to income generated in the foreign country, would remain the same. Thus, such a departure from the proper apportionment of a U.S.-incurred R&E expense to the foreign source income it generates must be viewed as in part a transfer of revenue from the U.S. Treasury to the treasuries of foreign governments.

B. Section 1.861-8 of the Treasury Regulations

1. Problems in the Allocation and Apportionment of Research and Experimentation Expenditures

The allocation and apportionment of R&E present difficult and sometimes unique problems. As to allocation, many types of production in a variety of locations can benefit from the same R&E projects; some products may benefit soon after the development of the R&E, others not for some time. Identifying the specific contribution of the R&E expense to income in any particular segment may be very inexact. Because R&E, especially basic R&E, is speculative and proceeds often by trial and error, R&E expenses often do not result in the manufacture of commercially viable products and, more often than other types of expenses, do not result in the production of income.

The apportionment of R&E expenses between foreign and U.S. source income is also difficult, largely because of the mismatch under the Code's rules between the time the deduction for R&E is allowed and the time the R&E produces income. The general tax accounting rule is that an expense which relates to tangible or intangible property is capitalized and offset against income through allowances for exhaustion of the property; an expense which produces current income is allowed as a deduction. This general rule does not apply to R&E expenses under the Code, which permits taxpayers to elect either to deduct currently R&E expenses or treat the expenditure as deferred expense amortizable over a period of not less than 60 months, without regard to whether or when the R&E expenditure results in the production of income. The current deduction of R&E expenses disassociates the expense from an identifiable asset or income. This disassociation is not a problem, or at least not nearly so large a problem, in the apportionment of other expenses (such as overhead expenses), both because those expenses are more easily related as a factual matter to the income they produce and because there is no equivalent Code rule mismatching current expense with current income generated by past expenses.

In summary, the allocation and apportionment of R&E expenses are plagued by more conceptual difficulties than any other allocation and apportionment issues. Given the constraints, any attempt to arrive at theoretically correct allocation and apportionment rules cannot be wholly satisfactory.

2. Allocation and Apportionment under the Regulation

The first Treasury regulations to address the allocation and apportionment of R&E expenses specifically were proposed in 1973. Under this proposal, R&E expenses were considered allocable to broad classes of gross income. The principal objection of taxpayers to these allocation rules was to the breadth of these classes and the vagueness of the regulations' standards.

The 1973 proposed regulations generally required that R&E expense be apportioned between domestic and foreign source income (after being allocated to a particular class of gross income) on the basis of relative amounts of sales in the year the expense was deducted. The sales method represented a change from the practice of many taxpayers either not to apportion R&E expense to foreign source income at all, or to apportion the expense on the basis of the taxpayer's relative amounts of foreign and U.S. source income (the "gross-to-gross method"). Taxpayers strongly argued that these practices were more accurate than the rule in the proposed regulations.

After extensive modifications to respond to public comments, new regulations were proposed in 1976, and the 1973 proposed regulations were withdrawn. The Regulation was adopted as a final regulation on January 3, 1977, effective for taxable year beginning after December 31, 1976.

The Regulation provides that R&E expenditures are definitely related to all income reasonably connected with the relevant broad category (or categories) of products licensed or sold by the taxpayer. R&E expenses are therefore allocable to all items of gross income from the product category (or categories), including income from sales, royalties, and dividends related to a product category or categories. The Regulation prescribes 32 product categories based on the 2-digit Standard Industrial Classification (SIC) system (e.g., chemicals and allied products (SIC code 28), petroleum refining (SIC code 29)). The use of the SIC system responded to taxpayer criticisms of the vague standards of the 1973 proposed regulations. At the same time, the breadth of the product categories, reflected in the use of the 2-digit rather than the narrower 3- or 4-digit SIC codes, acknowledges that R&E may provide benefits beyond a specific product line to related product lines within the product category.

As an exception to the general allocation rule and as an acknowledgment that government-required R&E may not be useful in foreign sales, qualifying R&E performed in response to a U.S. Food and Drug Administration or similar government agency requirement ("government-mandated R&E") which does not generate more than a de minimis amount of foreign source income may be allocated solely to U.S. source income.

Having been allocated to a class of gross income, R&E expense must be apportioned between the U.S. and foreign components of the class. The objective of the Regulation is to match an expense with the income related to the expense. The Regulation's basic apportionment rule compares relative amounts of gross sales producing U.S. and foreign source gross income; however, a taxpayer may use, within certain limitations, an alternative method based on relative amounts of U.S. and foreign gross income.

By placing restrictions on the use of the gross income method which are not applicable to the sales method, the Regulation recognizes that, from a tax policy standpoint, the sales method is preferable to the gross income method. A U.S. taxpayer's foreign source gross income to which R&E expenses are allocated and apportioned will likely consist of royalties paid by foreign affiliates and unrelated parties for the use of the R&E abroad and dividends paid by foreign affiliates which reflect the affiliates' earnings from sales of products the development of which the R&E enhanced. However, the U.S. taxpayer's U.S. gross income to which the R&E expenses are allocated and apportioned will, in contrast, basically be gross sales less cost of goods sold. This gross income does not take into account any deductions for depreciation, advertising, officers' salaries, and other overhead expenses. Since the gross amounts of royalties and dividends, when received by the U.S. taxpayer from the foreign parties, reflect these overhead expenses incurred by the foreign parties, the gross amounts of foreign source income may be disproportionately small and that of U.S. source income disproportionately large. Moreover, in the case of dividends, the amount is within the discretion of the taxpayer, and thus, if earnings are reinvested rather than repatriated, a zero amount of foreign dividend income would be utilized in the formula.

Thus, an apportionment of R&E based on gross income without some restrictions could in some cases result in an over-apportionment of R&E expenses to domestic source gross income and an overstatement of foreign source taxable income and the foreign tax credit limitation. The foreign tax credit could as a consequence reduce U.S. tax on U.S. source income. Nonetheless, by permitting the use of the gross income method within prescribed limits, the Regulation recognizes that an apportionment method other than the sales method may be at least as or more appropriate than the sales method in certain cases.

Under the sales apportionment method a taxpayer which performs more than one-half of its R&E in a particular geographic area may make an "exclusive apportionment" of 30 percent of its R&E expense to income from that source. Thus, a taxpayer which performs more than one-half of its R&E in the United States may exclusively apportion 30 percent of its R&E expense to U.S. source income. (A taxpayer may establish to the satisfaction of the Internal Revenue Service that, because the R&E is reasonably expected to have very limited or long delayed application outside the United States, a higher percentage is warranted in its case.) This rule recognizes that R&E is often most valuable in the country in which it is performed. The exclusive apportionment percentages were 50 and 40 in taxable years beginning in 1977 and 1978, respectively, the first two taxable years in which the Regulation was in effect. The phase-down was provided as an incentive to R&E and in order to give taxpayers an opportunity to adapt to the new Regulation.

After the exclusive apportionment, the remaining R&E expense is apportioned on the basis of relative amounts of sales within the product category producing foreign source income and sales within the product category producing U.S. source income. For this purpose the taxpayer's sales include its own sales as well as sales of certain unrelated parties, such as licensees, and sales of controlled corporations that benefit from the R&E connected with a product area.*

To illustrate, assume that in 1977, when the exclusive apportionment percentage was 50 percent, T, a U.S. taxpayer, deducts on its tax return $60,000 of R&E expenses incurred in the United States to invent and patent a new gasoline engine. X, a subsidiary of T, and Y, an unrelated licensee of the patent, manufacture and sell the gasoline engine abroad. In 1977 the domestic sales by T of the new engine are $500,000 and the foreign sales by X and Y of the new engine are $200,000 and $100,000, respectively. T may exclusively apportion $60,000 multiplied by 50 percent, or $30,000, of the R&E expense to U.S. source income. The remaining $30,000 is apportioned on the basis of the sales of the engine by T, X, and Y. Since total U.S. sales of the engine are $500,000 and total sales of the engine are $800,000, 5/8 multiplied by $30,000, or $18,750, of the R&E expense (in addition to the exclusively apportioned $30,000) is apportioned to U.S. source income. Since total foreign sales are $200,000 plus $100,000, or $300,000, 3/8 multiplied by $30,000, or $11,250, of the R&E expense is apportioned to foreign source income.

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* Where a reasonable estimate of sales of unrelated licensees cannot be made, the sales of those licensees are deemed to be an amount equal to 10 times the royalty received by the taxpayer from the licensee for the use of the intangible property produced by the R&E. A related party's sales are not taken into account where the related party has entered into a _bona fide_ cost-sharing arrangement with the taxpayer.

As mentioned above, a taxpayer may choose, subject to certain limitations* and as an alternative to the sales method, to apportion R&E on the basis of relative amounts of U.S. and foreign source gross income. This method applies to all of the gross income of the taxpayer, not gross income on a product category basis. Under this method the 30 percent exclusive apportionment is not available. The exclusive apportionment is founded on the close nexus between R&E performed and products sold in a particular geographic area. Under the gross income method, R&E expense is apportioned not only on the basis of relative U.S. and foreign sales, but also on the basis of relative amounts of U.S. and foreign dividend, royalty, and perhaps other types of income. Although R&E performed in a particular area may disproportionately benefit sales in that area, it will less clearly, or at least less directly, contribute disproportionately to the production of dividends, royalties, and other income from that area which only indirectly reflect sales.

To illustrate the gross income method, assume that in the gasoline engine example, T's gross income is $150,000, of which $140,000 is from domestic sales and $10,000 is a royalty from X. T may tentatively apportion $60,000 multiplied by 10,000/150,000, or $4,000, of the R&E expense to foreign source income. However, since this amount is less than $5,625 (50 percent of the $11,250 apportioned to foreign source income under the sales method), T must under the gross income method apportion $5,625 to foreign source income and $54,375 to U.S. source income.

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* R&E expense apportioned to foreign source gross income under the gross income method must be at least 50 percent of the amount that would be apportioned under the sales method. This method permits the R&E apportioned to foreign source income to be reduced by up to one-half the R&E that would be apportioned under the sales method.

As noted above, under the gross income method R&E expenses are apportioned on the basis of all of the taxpayer's gross income, including dividends from foreign affiliates. Failure to take into account such dividends may systematically understate foreign source gross income. U.S. source gross sales income reflects all income from the product -- even profit that is not necessarily attributable to the R&E expense. Royalties paid by foreign affiliates to the taxpayer for the use of the intangible to which the sales income of the affiliates are attributable must be less than their sales income net of expenses (otherwise the affiliates would have no profit from the sales). To the extent the sales profit of the foreign affiliate is repatriated to the taxpayer in the form of dividends and taken into account in the apportionment formula, U.S. and foreign source gross income can more legitimately be compared since both types of income will include sales profit from products benefiting from the R&E.

3. History of the Regulation After its Adoption

In the Economic Recovery Tax Act of 1981 ("ERTA"), Congress provided that for a two-year period R&E expenses incurred for research activities conducted in the United States would be allocated and apportioned to income earned in the United States and, in effect, suspended the portion of the Regulation requiring apportionment of some domestic-performed R&E expenses to foreign source income. At the same time, Congress directed the Secretary of the Treasury to study the impact of the Regulation on the conduct of domestic R&E and the availability of the foreign tax credit.

The Treasury Department issued its report (the "Report") in June 1983. The Report recommended a two-year renewal of the suspension in order to provide the Administration and Congress an opportunity to develop a coherent national program of R&E incentives.

In 1984 the suspension was renewed, applicable to taxable years beginning on or before August 1, 1986. During the renewed suspension the Treasury Department consulted extensively with representatives of affected industries in an effort to develop a coherent R&E tax incentive program. Although a permanent resolution of the R&E allocation issue was not achieved prior to the expiration of the renewed suspension, and the suspension was not again renewed, TRA provided a one-year partial suspension of the Regulation applicable to taxable years beginning after August 1, 1986 and on or before August 1, 1987.

This partial suspension provides for an exclusive apportionment to U.S. source income of 50 percent of a U.S. taxpayer's deduction for expenses attributable to U.S.-conducted R&E activities. This exclusive apportionment is available to a taxpayer using either the sales or gross income method. The taxpayer may apportion the remainder of the deduction on the basis of either of these methods without limitation.*

TRA also provided that, in general, the taxable income of each member of an affiliated group of corporations should be determined by allocating and apportioning all expenses of each member as if all the members were a single corporation. Prior to TRA, affiliated groups were able to increase artificially the foreign tax credit limitations of members of the group by incurring expenses in those members with disproportionate amounts of domestic (as opposed to foreign) sales, income, or assets. TRA suspends this general rule for affiliated group allocation and apportionment with respect to R&E expenses for the one-year period covered by TRA's partial suspension of the Regulation.

The Regulation represents an attempt to meet the objective of matching an expense with the income it produces. As noted above, the allocation and apportionment of R&E expenses presents unique difficulties, probably more intractable than most other problems in the complex area of tax law which deals with expense allocation and apportionment. The Regulation cannot be defended as perfect; given the theoretical problems, no apportionment rule could be so defended. The Regulation is one plausible answer to allocation and apportionment problems, but there are undoubtedly others as well.

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* TRA suspends the rule in the Regulation requiring the apportionment to foreign source income by a taxpayer using the gross income method of at least half the portion of the R&E deduction that would have been apportioned to foreign source income under the sales method. TRA also suspends the requirement that, in order to apportion exclusively a fixed percentage of its R&E expense to U.S. source income, the taxpayer must perform more than one-half its R&E in the United States. Finally, under TRA a taxpayer may not establish (as under the Regulation) that its facts and circumstances justify an exclusive apportionment greater than that calculated by reference to the fixed percentage.

IV. Administration Proposal

While there are reasonable arguments to defend the Regulation from its criticisms, it is fair to say that these issues have been so controversial that a regulatory resolution is simply not the appropriate way to bring this matter to a close. It is for this reason that the Administration now seeks a statutory solution. It is critically important, moreover, that we achieve a permanent R&E allocation and apportionment rule. This controversy is now well into its second decade, and we all have a stake in ending it as soon as possible. The various regulatory changes, temporary moratoria, and the 1986 partial suspension have made for an unstable tax environment for those firms which perform substantial R&E and also have significant foreign operations.

We have carefully considered appropriate rules for allocation and apportionment of R&E expenses not only in light of the criteria set out above for a desirable R&E tax incentive but also in light of the concerns of representatives of affected industries we have consulted. As a permanent solution to the R&E apportionment issue, the Administration proposes to make the rule in TRA permanent, commencing with taxable years beginning after August 1, 1987, with the exception that the exclusive apportionment percentage would be raised from 50 to 67 percent and the apportionment would be required to be done on an affiliated group basis.

We believe that this proposal constitutes a reasonable R&E incentive. Compared with the Regulation, it expands the availability of the gross income option in two respects. It permits taxpayers to use the option without the restriction that the deduction apportioned to foreign source income must be at least half the amount that would have been apportioned under the sales method. It also permits taxpayers using the gross income option, like taxpayers using the sales method, to apportion exclusively to U.S. source income 67 percent of their deduction for U.S.-performed R&E. Finally, as compared with both the Regulation and the rule in TRA, this proposal provides an added incentive by raising the exclusive apportionment percentage to 67 percent from 30 percent in the Regulation and 50 percent in TRA. The revenue cost of this proposal is $387 million for fiscal year 1988 and $3.262 billion for the budget period from 1988 through 1992. The revenue cost of the S.#116 proposal, which would provide that all R&E expenses attributable to activities conducted in the United States would be apportioned to U.S. source income, is $1.211 billion for 1988 and $5.423 billion for the budget period.

We do not propose a specific revenue initiative to offset the cost of the Administration proposal. Rather, we recommend that the cost be taken into account in the 1987 budget reconciliation process.

We are taking this initiative because we strongly believe that a tax incentive is necessary and appropriate for domestic R&E, and that our commitment to enhance U.S. competitiveness in the world economy necessitates decisive action.

* * * *

Thank you for this opportunity to present the views of the Administration to the Subcommittee. I would be pleased to answer your questions.

Table 1

The R&E Tax Credit and Comparison of R&D and Qualified R&E, 1981-1986
(Monetary amounts in billions of dollars and growth rates in percent)

Tax Return Data	1981	1982	1983	1984	1985	1986
Qualified R&E:	27.0*	26.2	28.2	NA	NA	NA
Annual Growth Rate:	40.4	-2.9*	7.7	NA	NA	NA
Base Amount:	19.2*	19.6	20.5	NA	NA	NA
Growth in Qualified R&E Over Base Amount:	40.4	33.5	37.5	NA	NA	NA
Credit Earned:	878	1535	1798	NA	NA	NA
Credit Carried Over:	0	118	390	NA	NA	NA
Credit Claimed:	628	829	1259	NA	NA	NA

National Science Foundation Data:**	1981	1982	1983	1984	1985	1986
Total R&D:	71.8	75.9	87.2	97.3	108.8	118.6
Annual Growth Rate:	14.7	5.7	14.9	11.6	11.8	9.0
Company-Funded R&D:	35.4	39.5	42.9	48.6	53.2	56.7
Annual Growth Rate:	16.1	11.6	8.61	13.3	9.5	6.6
Total Federally-Funded R&D:***	33.1	36.4	38.8	42.2	48.3	52.1
Annual Growth Rate:	11.1	10.0	6.6	8.8	14.5	7.9

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* Based on annualized 1981 half-year data.

** National Science Foundation, Division of Science Resource Studies. 1985 and 1986 numbers are preliminary.

*** Includes Federally-funded company performed R&D.

Table 2

1983 Percentage Distribution of R&E and R&E Tax Credits by Firm Size for Firms Claiming a Credit

Asset Size Class	Firms Performing R&E (Percent)	Share of Qualified R&E (Percent)	Share of Tentative Credit (Percent)	Ratio of Share of Credit to Share of Qualified R&E
Less than $1 million	44.1	1.8	3.7	2.05
$1 to $10 million	35.7	5.2	9.2	1.77
$10 to $50 million	11.8	5.2	8.4	1.62
$50 to $100 million	2.4	2.4	3.2	1.33
$100 to $500 million	3.1	8.3	10.9	1.31
$0.5 to 1 billion	0.8	4.5	4.0	0.89
$1 to 5 billion	1.4	26.9	23.9	0.89
$5 to 10 billion	0.4	9.7	7.2	0.74
$10 billion and over	0.3	36.1	29.4	0.81
Total	100.0	100.0	100.0	

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Table 3a

Qualified Research and Experimentation Expenditures and Tentative Credits Earned by Corporations by Industry in 1981 (monetary amounts in millions of dollars and growth rates in percent)

Industry	Receipts	Qualified R&E	Base Amount	Growth Rate Over Base Percent	Current Year Tentative Credit	Carry Over	Total Tentative Credit	Percent Tentative Credit
Agric&Forest&Fish	7064.8	24.6	17.3	42.2	1.7	NA	1.7	0.2
Mining	4479.1	8.2	4.9	67.3	0.7	NA	0.7	0.1
Crude Petrol&Gas	30926.3	127.3	71.9	77.1	12.3	NA	12.3	1.4
Contract Constrtn	18301.1	24.8	11.4	117.5	2.6	NA	2.6	0.3
Food&Tobacco	141749.2	314.6	231.9	35.7	20.2	NA	20.2	2.3
Txtls&Appl&Leather	22834.0	65.1	39.6	64.4	5.2	NA	5.2	0.6
Paper&Printing	20722.2	53.7	25.5	110.6	5.6	NA	5.6	0.6
Petroleum Refining	575902.2	782.7	420.7	86.0	73.8	NA	73.8	8.4
Chemicals&Rubber	189057.0	2211.1	1682.2	31.4	131.3	NA	131.3	15.0
Lumber&Furn&stone	80406.5	408.1	301.1	35.5	25.6	NA	25.6	2.9
Primary&Fab Metal	133266.7	548.2	334.2	64.0	41.1	NA	41.1	4.7
Machinery(excl Elec)	118512.1	2419.9	1895.0	27.7	127.1	NA	127.1	14.5
Elctrc/Elctronic	134337.3	1953.4	1385.1	41.0	129.6	NA	129.6	14.8
Transportation Eq	38992.0	523.9	396.0	32.3	29.5	NA	29.5	3.4
Motor Vehicles	116042.4	1416.1	1162.0	21.9	63.1	NA	63.1	7.2
Instruments	35197.5	756.2	517.7	46.1	51.3	NA	51.3	5.8
Other Manufactures	17280.9	132.8	72.1	84.2	11.7	NA	11.7	1.3
Tran&Com&Utils	375527.7	1009.1	671.2	50.3	77.2	NA	77.2	8.8
Trade	210371.0	125.2	69.3	80.7	11.4	NA	11.4	1.3
Finance&Ins&Real	107547.5	292.3	172.1	69.8	25.5	NA	25.5	2.9
Services	30448.5	294.2	130.7	125.1	31.2	NA	31.2	3.6
Other	40.2	0.6	0.4	50.0	0.1	NA	0.1	0.0
Total	2409006.2	13492.0	9612.2	40.4	877.7	NA	877.7	100.0

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Table 3b

Qualified Research and Experimentation R&E Expenditures and Tentative Credits Earned by Corporations by Industry in 1982 (monetary amounts in millions of dollars and growth rates in percent)

Industry	Receipts	Qualified R&E	Base Amount	Growth Rate Over Base Percent	Current Year Tentative Credit	Carry Over	Total Tentative Credit	Percent Tentative Credit
Agric&Forest&Fish	3216.9	60.2	47.5	26.7	3.1	1.0	4.1	0.2
Mining	4965.1	3.2	1.7	88.2	0.4	0.7	1.1	0.1
Crude Petrol&Gas	22549.1	279.3	179.0	56.0	23.9	0.7	24.6	1.5
Contract Constrtn	20009.5	65.2	30.6	113.1	6.6	0.7	7.3	0.4
Food&Tobacco	166928.2	571.0	422.9	35.0	35.5	0.8	36.3	2.2
Txtls&Appl&Leather	21342.8	104.1	66.7	56.1	8.4	0.5	8.9	0.5
Paper&Printing	26192.7	143.5	75.8	89.3	12.4	0.1	12.5	0.8
Petroleum Refining	497273.0	1335.3	1078.7	23.8	63.6	0.8	64.4	3.9
Chemicals&Rubber	208458.5	4393.2	3448.1	27.4	233.4	11.9	245.3	14.8
Lumber&Furn&stone	60825.5	734.4	576.2	27.5	37.4	1.4	38.8	2.3
Primary&Fab Metal	94482.4	856.4	631.1	35.7	46.7	3.6	50.3	3.0
Machinery(excl Elec)	97104.3	4921.7	3876.8	27.0	253.3	7.1	260.4	15.8
Elctrc/Elctronic	113271.7	3462.7	2402.3	44.1	240.7	32.0	272.7	16.5
Transportation Eq	33207.7	1138.3	859.9	32.4	68.3	5.7	74.0	4.5
Motor Vehicles	07814.7	2586.2	2299.7	12.5	71.1	19.8	90.9	5.5
Instruments	35121.2	1623.9	1202.0	35.1	101.7	4.6	106.3	6.4
Other Manufactures	18667.0	258.8	159.0	62.8	21.3	3.3	24.6	1.5
Tran&Com&Utils	398502.7	2164.4	1477.6	46.5	161.7	8.7	170.4	10.3
Trade	197346.9	207.6	123.2	68.5	18.7	1.3	20.0	1.2
Finance&Ins&Real	99971.3	540.1	330.9	63.2	48.5	3.8	52.3	3.2
Services	37716.8	707.9	312.7	126.4	77.1	8.8	85.9	5.2
N.A.	358.5	14.8	3.7	300.0	1.8	0.6	2.4	0.1
Total	2265326.4	26172.3	19606.2	33.5	1535.3	117.9	1653.2	100.0

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Table 3c

Qualified Research and Experimentation R&E Expenditures and Tentative Credits Earned by Corporations by Industry in 1983 (monetary amounts in millions of dollars and growth rates in percent)

Industry	Receipts	Qualified R&E	Base Amount	Growth Rate Over Base Percent	Current Year Tentative Credit	Carry Over	Total Tentative Credit	Percent Tentative Credit
Agric&Forest&Fish	2885.1	42.6	29.8	43.0	3.0	1.2	4.2	0.2
Mining	843.6	1.1	0.6	83.3	0.2	0.1	0.3	0.0
Crude Petrol&Gas	13829.2	264.9	184.9	43.3	18.0	3.9	21.9	1.0
Contract Constrtn	21673.1	49.6	27.3	81.7	4.6	2.0	6.6	0.3
Food&Tobacco	187274.1	714.1	519.6	37.4	45.1	1.9	47.0	2.1
Txtles&Appl&Leather	26015.6	111.4	72.1	54.5	8.6	0.9	9.5	0.4
Paper&Printing	25574.8	110.5	67.3	64.2	9.1	2.5	11.6	0.5
Petroleum Refining	378348.9	1175.2	935.7	25.6	53.3	0.2	53.5	2.4
Chemicals&Rubber	195916.4	4475.3	3485.6	28.4	242.8	39.0	281.8	12.9
Lumber&Furn&stone	75791.4	819.3	642.1	27.6	42.2	5.8	48.0	2.2
Primary&Fab Metal	82997.4	674.7	504.0	33.9	43.5	16.1	59.6	2.7
Machinery(excl Elec)	88927.4	4880.3	3601.8	35.5	309.2	32.8	342.0	15.6
Elctrc/Elctronic	154427.4	4598.0	3059.3	50.3	347.1	103.7	450.8	20.6
Transportation Eq	67166.0	1581.3	1186.1	33.3	95.9	30.4	126.3	5.8
Motor Vehicles	122339.8	2575.3	2210.1	16.5	92.1	49.6	141.7	6.5
Instruments	39723.7	1857.9	1338.5	38.8	126.5	10.2	136.7	6.2
Other Manufactures	16831.0	315.5	175.5	79.8	28.2	10.4	38.6	1.8
Tran&Com&Utils	334863.7	2327.9	1579.3	47.4	179.8	16.9	196.7	9.0
Trade	166921.9	225.4	136.9	64.6	20.0	4.7	24.7	1.1
Finance&Ins&Real	91699.9	451.8	283.1	59.6	39.5	19.6	59.1	2.7
Services	34947.5	946.1	472.1	100.4	89.8	38.3	128.1	5.9
N.A.	115.5	0.6	0.4	50.0	0.1	0.0	0.1	0.0
Total	2129113.6	28198.8	20512.2	37.5	1798.3	390.3	2188.6	100.0

Department of the Treasury
Office of Tax Analysis

April 2, 1987

Table 4

1983 Distribution of R&E and R&E Credit by Rate of Growth of Qualified R&E Over Base Amount
(Monetary amounts in millions of dollars)

Rate of Growth Over Base Amount	Total Qualified R&E	Total Tentative Credit	Average Assets	Average Qualified R&E
Zero Base	366	94	48	0.1
0%-5%	2,112	82	304	2.4
5%-10%	890	43	269	2.6
10%-20%	3,634	152	533	4.6
20%-40%	9,552	582	499	5.6
40%-60%	7,560	636	615	5.4
60%-80%	1,156	140	185	1.1
80%-100%	662	104	312	0.7
100%-140%	640	109	88	0.5
140%-200%	534	84	37	0.5
Over 200%	1,090	161	31	0.4
Total	28,198	2,189	187	1.5

Department of the Treasury March 30, 1987
Office of Tax Analysis

Table 5
Comparison of Incentives for R&E by Size of Assets

	Tentative R&E Credits in 1983						Effect of Section 861 Allocations on 1980 Foreign Tax Credits					
	Credits ($ mils.)	Distribution of Credits by Size	Corps. with Credits		% of Corps. with Credits, Weighted by		Change in Credits ($ mils.)	Distribution of Change by Size	Corps. Affected by 861 Allocs.		% Affected, Weighted by	
Size of Assets			Number	Percent	Assets	Receipts			Number	Percent	Assets	Receipts
Less than $1 million	74.1	3.4%	7667	0.3%	0.7%	1.5%	*	*	*	*	*	*
$1 to $10 million	192.0	8.8	6510	3.0	4.0	3.8	*	*	*	*	*	*
$10 to $50 million	185.9	8.5	2184	7.9	7.8	13.6	0.2	0.1%	70	0.3%	0.3%	0.5%
$50 to 100 million	70.5	3.2	454	8.0	8.1	23.3	0.8	0.4	56	1.2	0.9	2.2
$100 to 500 million	234.9	10.8	507	11.7	12.7	29.8	4.5	2.4	70	1.6	2.1	4.9
$0.5 to 1 billion	85.6	3.9	148	17.5	18.1	40.6	11.6	6.1	35	4.8	5.0	10.0
$1 to 5 billion	527.5	24.2	266	28.0	29.9	51.9	57.6	30.3	82	10.3	11.8	21.7
$5 to 10 billion	166.5	7.6	66	38.8	39.0	58.0	36.6	19.3	23	20.5	20.8	30.8
$10 billion and over	642.0	29.5	58	51.8	62.8	83.3	78.7	41.4	23	31.5	39.2	65.2
Total	2179.0	100.0%	17948	0.6%	34.7%	34.0%	190.0	100.0%	359	*	15.7%	16.4%

Department of the Treasury
Office of Tax Analysis

April 2, 1987

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* Less than 0.1

Table 6
Comparison of Incentives for R&E by Industry

	Tentative R&E Credits in 1983						Effect of Section 861 Allocations on 1980 Foreign Tax Credits					
			Corps. with Credits		% of Corps. with Credits, Weighted by				Corps. Affected by 861 Allocs.		% Affected, Weighted by	
Industry	Credits ($ mils.)	Distribution of Credits by Industry	Number	Percent	Assets	Receipts	Change in Credits ($ mils.)	Distribution of Change by Industry	Number	Percent	Assets	Receipts
Agriculture, forestry, fishing	4.3	0.2%	98	0.1%	4.9%	5.6%	*	*	1	*	0.1%	0.1%
Mining except oil and gas	0.3	*	9	0.2	7.4	5.2	*	*	1	*	1.5	1.8
Mining: oil and gas	21.8	1.0	119	0.4	15.6	12.7	1.0	0.5%	5	*	24.5	11.4
Contract construction	6.4	0.3	199	0.1	11.1	7.7	*	*	2	*	2.2	1.2
Manufacturing												
Food and tobacco	46.8	2.1	355	2.2	71.4	58.5	5.2	2.8	41	0.3	40.8	28.0
Textiles, apparel, leather	9.6	0.4	227	1.0	29.6	22.8	0.2	0.1	4	*	4.0	2.9
Paper and printing	11.4	0.5	325	0.9	35.1	28.3	6.6	3.5	19	0.1	36.5	26.5
Petroleum refining	51.7	2.4	22	3.0	89.4	83.1	20.0	10.5	15	5.8	74.3	[illegible]
Chemicals and rubber	288.0	13.2	1581	7.1	75.7	72.5	47.8	25.1	57	0.3	42.3	[illegible]
Lumber, furniture, stone	48.2	2.2	920	2.6	42.7	39.1	1.6	0.8	10	*	3.5	[illegible]
Metal products	59.1	2.7	1541	3.2	40.0	34.3	4.0	2.1	28	0.1	9.2	8.8
Machinery	336.1	15.4	1432	5.7	62.4	57.6	71.0	37.4	44	0.1	35.0	29.6
Electrical and electronic	458.4	21.0	2573	14.1	88.6	83.2	17.8	9.4	36	0.3	49.5	40.2
Transportation equipment	124.4	5.7	288	6.2	61.7	71.4	0.8	0.4	7	0.2	27.1	34.7
Motor vehicles	140.8	6.5	172	5.8	79.3	75.1	0.2	0.1	10	0.4	13.3	12.5
Instruments and other	167.7	7.7	1727	6.3	66.2	60.3	12.6	6.7	26	0.1	21.1	19.7
Transportation, communications, utilities	196.3	9.0	1533	0.5	45.6	26.9	0.6	0.3	10	*	3.4	2.7
Wholesale and retail trade	24.2	1.1	1000	0.2	20.6	11.3	0.2	0.1	14	*	10.1	3.0
Finance, insurance, and real estate	58.6	2.7	505	0.1	22.4	24.4	*	*	15	*	11.2	6.3
Services	124.9	5.7	3319	0.4	13.2	8.9	0.3	0.1	16	*	1.8	1.2
Other	0.1	*	3	*	1.9	2.9	*	*	*	*	*	*
Total	2179.0	100.0%	17948	0.6%	34.7%	34.0%	190.0	100.0%	359	*	15.7%	16.4%

Department of the Treasury
Office of Tax Analysis

March, 1987

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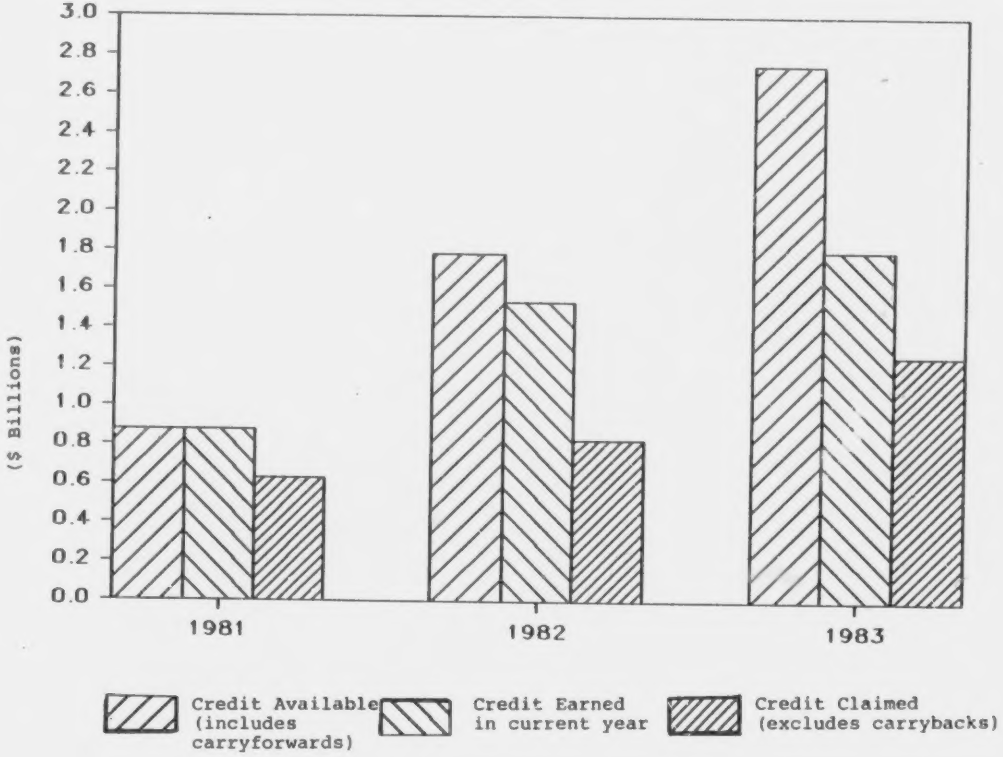
* Less than 0.1

Figure 1

Comparison of the R&E Credit Available, the R&E Credit Earned, and the R&E Credit Claimed by Corporations in 1981-1983



Appendix

Examples Showing Why the Effective Rate of Credit of the Current Law R&E Credit Is Less Than the Statutory 20% Rate

The effective rate of credit of the current law incremental R&E tax credit depends on (1) a firm's growth in R&E over its base amount in the current year and the three following years, (2) the ability of the firm to utilize the credit in the current (or prior) year and the three following years, and (3) the firm's rate of discount. Although there are a myriad of possibilities, a few examples can illustate the main points, which are:

* the effective rate of credit is generally a fraction of the 20% statutory rate of credit.

* firms with R&E below their base amount actually have incentives to delay any additional R&E.

* high growth firms facing the base constraint are likely to have a negative effective rate of credit (i.e., may postpone additional R&E) if they believe their rate of growth in R&E will decline to more typical levels in the following three years.

* firms unable to use the credit in the year earned have significantly reduced incentive effects because their future base amount does not reflect the fact that they were unable to use the credit.

Example 1: The "normal" case.

Suppose a firm in the past and in the future has R&E growth of 10 percent, expects to have sufficient tax liability to be able to use the credit in the year earned, and has a discount rate of 10 percent.

The firm with current R&E of 100 will have a base of 82.9, the average of the the previous three years' R&E (75.1, 82.5 and 90.1). For an additional dollar of R&E, the firm will earn a credit of 20 cents in the current year. However, it also increases its base in each of the following three years by 33.3 cents and therefore reduces the credit in each of the following years by 6.7 cents. The present value (with a ten percent rate of discount) of an increase in credit of 20 cents in the current year and a reduction of 6.7 cents in each of the following three years is 3.4 cents.

Example 2: The negative growth case.

Suppose the firm's base amount and discount rate are the same as in the previous example except the firm has decided that 80 is the level of R&E it would like to perform. If the firm were to perform an additional dollar of R&E, the firm would receive no increase in credit, but its base amount in the following three years is increased. The tax effect of an additional dollar of R&E is thus to reduce the credit in each of the following three years by 6.7 cents. The present value of the 6.7 cent reduction in each of the following three years is a negative 16.6 cents.

Conversely, if the firm were to reduce its current R&E by a dollar, there would be no change in current credit, but increased credits of 6.7 cents in each of the following three years would result. A negative effective rate of credit means the firm has incentive to reduce (postpone) its R&E.

Example 3: The high growth case.

Suppose the same base and discount rate as in the previous two examples, but the firm decides to increase its current year R&E to 200. Current law does not permit the base to be below 1/2 of current expenditures (in this case 100). Thus, if the firm increases its R&E by one dollar it also increases its base by 50 cents. In this case, each additional dollar of R&E earns 10 cents of credit in the current year. If the firm's growth returns to somewhere between 0 and 100 percent over its base amount in the following years (which is frequently the case), it will reduce credits in each of the following years as before by 6.7 cents. The present value of an increase of 10 cents in the current year and reductions of 6.7 cents in the following three years is a negative 6.6 cents.

Example 4: The delayed credit case.

Suppose as in example 1 the firm increases its R&E every year, but does not have sufficient tax liabilities (either in the current year or the prior three years) to use the credit in the year earned. If the firm must wait one year to use the credit, the delayed credit reduces taxes in the following year by 20 cents while the increased base (as in previous example) reduces credit in each of the following three years by 6.7 cents. The present value of 13.3 (20-6.7) tax reduction in the following year and a credit reduction of 6.7 cents in the second and third years is 1.6 cents. Similar calculations show that if the firm must wait two years, the effective rate of credit is 0.5 percent, and if the firm must wait 3 or more years, the effective rate of credit is zero.

These examples are illustrated in the attached table.

Example 1

	year$_{-3}$	year$_{-2}$	year$_{-1}$	current year	year$_{+1}$	year$_{+2}$	year$_{+3}$
qualified R&E ($)	75.1	82.5	90.1	100.0	110.0	121.1	133.3
Base ($)				82.9	91.2	100.3	110.3

For $1 increase in current year:				
Change in credit (cents)	20.0	-6.7	-6.7	-6.7
Present Value of Change in Credit (cents)	20.0	-6.1	-5.5	-5.0
Sum of PV (cents) (= effective rate of credit)	3.4			

Example 2

	year_{-3}	year_{-2}	year_{-1}	current year	year_{+1}	year_{+2}	year_{+3}
qualified R&E ($)	75.1	82.5	90.1	80.0	88.0	96.8	106.5
Base ($)				82.9	84.5	86.3	88.3
For $1 increase in current year:							
Change in credit (cents)				0	-6.7	-6.7	-6.7
Present Value of Change in Credit (cents)				0	-6.1	-5.5	-5.0
Sum of PV (cents) (= effective rate of credit)				-16.6			

Example 3

	year_{-3}	year_{-2}	year_{-1}	current year	year_{+1}	year_{+2}	year_{+3}
qualified R&E ($)	75.1	82.5	90.1	200.0	220.0	242.0	266.2
Base ($)				100.0	124.5	170.3	220.7
For $1 increase in current year:							
Change in credit (cents)				10.0	-6.7	-6.7	-6.7
Present Value of Change in Credit (cents)				10.0	-6.1	-5.5	-5.0
Sum of PV (cents) (= effective rate of credit)				-6.6			

Example 4

	year_{-3}	year_{-2}	year_{-1}	current year	year_{+1}	year_{+2}	year_{+3}
qualified R&E ($)	75.1	82.5	90.1	100.0	110.0	121.1	132.2
Base ($)				82.9	91.2	100.3	110.3
For $1 increase in current year:							
Change in credit (cents)				0.0	13.3	-6.7	-6.7
Present Value of Change in Credit (cents)				0.0	12.1	-5.5	-5.0
Sum of PV (cents) (= effective rate of credit)				1.6			

STATEMENT OF PROF. ROBERT EISNER, NORTHWESTERN UNIVERSITY, CHICAGO, IL

Professor EISNER. Mr. Chairman, I will be happy to do so.

I should say that I certainly appreciate the good intentions of the members of the committee and the sponsors of the legislation. R&D is a good idea. I have long felt that increases in productivity and progress come from what we call human capital, from knowledge, from research, to a considerably larger extent probably than from all the hardware and the buildings and equipment or structures that we have talked that much about.

I do approach this matter, I have to insist, quite independently. I was asked by the NSF to do a study of this to see how the initial credit was going, along with a number of other people who have, I think, come up with remarkably similar conclusions to mine. I was open-minded. I represent no group. I have done no work for any industry group or any other lobby.

And what I have come up with is that the basic idea of Government support for R&D is good. As was pointed out, research and experimentation, R&D, involves what economists call "externalities," benefits that go beyond the individual undertaker. That is true essentially for basic research, not for the applied research, for the development, for which there are patents; there is protection, and there is the opportunity for a firm that undertakes it to make its profit ultimately as a consequence of the research. That means there is not an argument for intervening in the free market with regard to research where there are not these externalities.

And yet, the current law really applies to only about—to start basic research—it is taking care of only about four percent of the expenditures of companies' sponsored research. Now, having said that, I have to go into very quickly—and of course, my statement does it in some detail—the infirmities of the current law. You know, good intentions are one thing, and I appreciate the good intentions of all the sponsors.

The fact is—and I use these words in my statement—this is a "turkey" really. I hope members of the industry would recognize it. We are interested in incentive effect. The formulation of this is of such a nature that for many firms, there disincentives; it is perverse. And the reasons go into the makeup of it. It is not that it is an incremental credit in itself; that I think was a good idea, to try to get maximum back for the buck.

But think for a moment. If you take firms that don't have tax liabilities, which include a lot of the new startup small firms with which we are concerned, they get no benefit out of it. They have no incentive to go ahead with R&D from this; they are not helped. Second, you take firms whose R&D is below base; they are not going to get any incentive out of it. Third, you take those few firms who actually have their R&D growing by more than 100 percent over base. There are—and I could point it out here, but I am not going to since it is in my statement—there is a disincentive there.

I might add that Secretary Mentz's statement was splendid in pointing up many of these things that I had found and worked up previously.

Now, the basic deformity of the current law is a curious one, and economists now are well aware of this problem. It is a whole problem of expectations or what you can really expect to get, not just this year but in the future. And it was a good idea to try to have a base which was tied to the company so that each company would not feel it had to struggle against odds that had nothing to do with it in trying to get some incremental credit.

But the defect here is that the company base is adjusted each year by the company's own expenditures. Now, what that comes down to—and it is undeniable—is that you are not giving them a 20 percent credit; you are giving to them simply a deferral in regard to increases in expenditures because, if you actually act on this legislation under the law now and you increase your expenditures, what you do is you raise your own base, which means you get a tax benefit now which you lose over the next three years.

The only real benefit is this deferral, which is important to a point because everybody knows it is better to pay taxes later than now; but given current interest rates of seven percent, for example—it won't make that much difference if you use 10 percent, as I did a few years ago—you will find that your 20 percent credit comes out to an effective credit of 2.5 percent. Now, the Congress can do better than that.

If you want to give a 20 percent credit or a 25 percent credit, make it effective; and there are ways to correct the credit to do that. It was suggested by the Secretary, and I think I have actually the best method in mind, and that is to adjust that company base year by year on the basis of the growth of R&D spending in the industry, because then no company will feel that, by increasing its spending, it is only going to raise its taxes in the future because increasing its spending will raise the industry average but sort of trivially. And indeed, under the current law, the forms the companies have to fill out indicate their product line; so that could be pretty simple.

You could even let the firm pick its own industry,; it wouldn't make that much difference. Obviously, it would be subject to some audit, as any taxpayer is. So, you have that situation then, just in terms of the analytics of it.

Now, what actually happened is that I have done work——

Senator BAUCUS. Would you wrap up your testimony, please?

Professor EISNER. Surely. I have done work, and Professor Mansfield at Pennsylvania, who is an outstanding student of this, has done work; there are other works. The Chelser Associates did something for NSF. We have all found there is virtually no reasonable evidence—reliable—that the credit has increased R&D.

There have been surveys of people in the industry asking how they react; and again, my statement points to that.

So, let me conclude by suggesting that if you do want to extend the credit—and offer support for research—the way to do it is really through direct support, Government research support for nonprofit institutions, and support for basic research where you can find it and with an effective credit—if you are going to use a credit device—that works.

Senator BAUCUS. Thank you, Professor Eisner.

Dr. Baily?

[The prepared written statement of Professor Eisner follows:]

3/31/87

Proposals to Increase and Extend
the
Research and Experimentation Tax Credit

Prepared Statement of Robert Eisner
Senate Committee on Finance
Subcommittee on Taxation and Debt Management
April 3, 1987

I appreciate the opportunity to testify on the Research and Experimentation tax credit before this Committee. I have no connection and have had no connection with any interested firm, trade association or lobby.

The work on which I base my statement was financed by the National Science Foundation with the aim of securing an objective evaluation of the temporary R&E — or R&D -- credit and possible amendments if it were to be continued. The NSF is of course not responsible for my conclusions. I speak for myself.

The road to hell, it is said, is paved with good intentions.

I am not about to argue that the R and D tax credit, euphemistically labelled "R and E" for "research and experimentation," will in itself lead the nation to doom. But it has proved a misguided step in a poorly focused direction. This is no time to increase it, or make it "permanent."

The argument for government support of R and D in a free enterprise economy is simple. To the extent that benefits of research flow outside of firms undertaking it, each individual company is likely to underinvest, undertaking only those expenditures for which its own likely benefits exceed its costs. But accepting the principle that government policy should encourage more research does not answer the question of how that should be done. The original tax credit for research and experimentation, which expired at the end of 1985, proved something of a monstrosity, ultimately costing the Treasury some $1.5 billion per year, with no clear positive payoff. It was an expensive, failed experiment. Unfortunately, the Congress nevertheless saw fit to renew it, but did have the good judgment to reduce the amount of the credit from 25 percent to 20 percent, and to set it again for expiration after three years, this time at the end of 1988.

II

Under the current law, businesses are presumably offered a tax incentive to increase R and D. Specifically they are allowed a credit against tax liabilities equal to 25 percent of the excess of qualified R and D expenditures over their "base," now defined as the greater of 1) the average of their expenditures over the three previous years and 2) half of current expenditures. If the firm has insufficient tax liabilities, or none at all, it can carry unused credits back three years and forward 15 years.

On purely analytical grounds, the potential of the current credit can be shown to be substantially limited. First, it clearly offers no tax benefit and no incentive to firms whose R and D is below the base established by its previous R and D expenditures. In fact, such firms would rationally reduce their current R and D spending in the expectation that by lowering their base for the future they could enjoy a tax benefit later.

Second, firms already planning to increase R and D spending by more than 100 percent of their base actually enjoy a credit, on any additional R and D spending, of only 12 and one-half percent rather than the nominal 25 percent. For such firms the base is 50 percent of current expenditures, and each additional dollar of R and D spending, since it increases the base by 50 cents, increases the excess over base by only 50 cents. The credit of 25 percent, applied to this 50 cents excess, thus amounts to only 12.5 cents on the increased dollar of R and D spending.

For these firms too, then, the presumed tax incentive for R and D is actually perverse. They would be better off reducing their current spending to a level that constitutes no more than a 100 percent increase over the average of their previous spending. They would be losing only 12.5 cents per dollar of reduced R and D spending in terms of current taxes, but could expect to gain 25 cents in future tax benefits by lowering their base for the future.

Third, many firms, and many in the rapidly growing high-tech field, have no tax liabilities against which to apply the credit. Unless they have had such liabilities over the past three years, all the more unlikely in new firms, they gain nothing from the carry-back provision. And since, as we shall see, the benefit of the tax credit is in the present value of postponing taxes, they are likely to perceive little gain from the carry-forward provision, and no gain at all if tax liabilities are not anticipated over the next three years.

But a fourth and overwhelming problem with the current credit is its relation to a base calculated from the firm's own previous expenditures. This vastly reduces the incentive effects of the credit, and this defect becomes critical if the credit is made permanent. For firms must then reckon that any increase in current R and D expenditures will raise the base which must be subtracted in calculating the credit for future expenditures. Firms with generally increasing R and D expenditures (whether real increases or increases due to inflation) will benefit not by reducing taxes but only by postponing them over a three-year period.

For example, a $15 increase in R and D spending would reduce taxes by $3 in the current year, but it would raise the base by $5 and raise taxes by $1 in each of the succeeding three years. Except for the fact that time is money, and it is better to pay taxes later than to pay them now, the firm has no benefit at all.

Since time is money, we should indeed calculate the difference between the $3 current tax saving and the present value of the increased taxes of $1 in each of the next three years. With a 7 percent rate of discount, reasonable with current interest rates, that present value is $2.62 thus wiping out all but 38 cents of the original $3 gain. Thus, the nominal tax credit of 25 percent translates into 38 cents on $15 in R and D, an effective credit of 2.5 percent.

Paradoxically, firms have a much greater incentive to increase R and D if they do not expect the credit to last. If indeed the Congress were to make it clear that the current credit would not be extended beyond 1988, the effective rate of credit next year would be the full 25 percent, because increasing expenditures currently would bring no offset in a reduced credit and higher taxes in the future.

An analysis of special tabulations of 1981 tax returns prepared for me by the Office of Tax Analysis of the Treasury, as well as other data, indicate that there is real substance to these analytical perversities.

First, as against a "tentative credit" of $872 million (for the half year of 1981 that the credit was in effect), the credit actually claimed was only $630 million, indicating a shortfall of 28 percent due to lack of current tax liabilities. Of $13.4 billion of reported qualified R and D expenditures, as shown below in Table 2, only $9.2 billion, or 63.2 percent, were incurred by firms with sufficient tax liabilities to claim all of their potential 1981 credit.

Second, the proportion of qualified R and D by firms that reported R and D up by more than 100 percent, so that their nominal marginal credit was cut in half, came to 9.2 percent. Of the $9.2 billion of R and D on which a credit was claimed, $0.7 billion was done by firms in this category. Thus, only 63.2 percent of total qualified R and D expenditures, $8.5 billion out of $13.4 billion, were incurred by firms with tax liabilities against which they could claim the full credit. And this does not take into account some 6 percent of expenditures, as we have calculated from SEC reports tabulated by Compustat, undertaken by firms who would not have filed for the credit at all because their 1981 expenditures were below their base.

Another count against the current R and D tax credit is that is procyclical. In recessions, R and D expenditures, like all other expenditures, tend to slacken. Since the credit is tied to the rate of growth of R and D expenditures, it is particularly sensitive to such a slackening. A decline merely in the rate of growth from, say, 12 percent to 6 percent, would cut the credit in half. Further, with more firms suffering losses in a recession, tax liabilities against which the credit may be claimed are less numerous. An examination of Compustat data reveals that in the recession year of 1982 the proportion of R and D expenditures undertaken by firms with tax liabilities and expenditures above base was down to 52.7 percent. On both counts, therefore, the R and D tax credit tends to be lower in recession when tax reductions would appear particularly desirable to stimulate the economy, and higher in booms, when a tighter tax policy might appear useful to prevent inflationary excesses. Indeed, since the credit relates to increases in nominal R and D expenditures, inflation serves to increase the credit and reduce taxes, again the opposite of what would be indicated by appropriate counter-cyclical policy.

III

It is easy for naive or biased investigators to claim that the tax credit has contributed to growth in R and D, for company-funded R and D has been growing. But the rates of growth have been declining. They were 16.2 percent in 1981, the first year (or half-year) of the credit, 11.5 percent in 1982 and 7.8 percent in 1983 to a total of $42.6 billion in that year, as shown in Table 1. And they were generally higher and rising, before the tax credit was instituted; 14.3 percent in 1978, 16.2 percent in 1979 and 18.5 percent in 1980. With adjustment for inflation, the rates of growth before the credit were 6.5 percent, 7.0 percent, and 8.6 percent, for the years 1978 to 1980, With the credit, from 1981 to 1983, real rates of growth were down to 6.0

percent, 5.2 percent, and 3.6 percent. The per annum real growth from 1977 to 1980 was 7.3 percent, while from 1980 to 1983 it was only 5.0 percent. Inclusion of the projected expenditures for 1984 raised the real post-credit growth rate to 5.7 percent, but that was still less than the growth before the credit became effective. And more recently, with the credit restored by Congress after the early 1986 hiatus, the National Science Foundation sees R and D spending again sluggish, rising at an average annual rate of only 2 percent from 1985 to 1987.

Table 1. R&D Expenditures, 1977-80 and 1981-84

(1)	(2)	(3)	(4)	(5)
Year	Company Funds for R&D*		Rates of Growth	
	Current Dollars	1972 Dollars	Current Dollars	1972 Dollars
	(Millions)		(Percent)	
1977	$19,340	$13,809	10.9%	4.8%
1978	22,115	14,702	14.3	6.5
1979	25,708	15,731	16.2	7.0
1980	30,476	17,081	18.5	8.6
1977 to 1980, per annum growth	16.4%	7.3%		
1981	35,428	18,112	16.2	6.0
1982	39,512	19,053	11.5	5.2
1983	42,600	19,783	7.8	3.6
1984, projected	47,712	21,359	12.0	8.1
1980 to 1983, per annum growth	11.8%	5.0%		
1980 to 1984, projected, per annum growth	11.9%	5.7%		

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*From National Science Foundation, Research and Development Industry, 1983, forthcoming. Current dollar figures were converted to 1972 dollars with GNP implicit price deflators. Projection for 1984 from the 12 percent increase over 1983 indicated in Science Resources Studies Highlights, NSF 84-329, October 15, 1984.

Sober analysis offers little if any hard evidence of much increase in real R and D spending as a consequence of the credit. The Division of Policy Research and Analysis of the National Science Foundation funded separate projects by Professor Edwin Mansfield of the University of Pennsylvania and by the current writer to evaluate the R and D tax credit shortly after it was instituted. Professor Mansfield, a distinguished scholar in the area of technologlical change and innovation, concluded on the basis of surveys and other analysis: "In all countries we studied, R and D tax credits and allowances appear to have had only a modest effect on R and D expenditures. In the United States, Canada, and Sweden, the results are quite similar, each of these R and D tax incentives having increased R and D expenditures by about one percent.... In all of these nations, the increased R and D expenditures due to the tax incentives seem to be substantially less than the revenue lost by the government.... In each country, there was substantial evidence that these tax incentives resulted in a considerable redefinition of activities as R and D, particularly in the first few years after the introduction of the tax incentive."[1]

My own work failed to uncover any clear evidence that the tax credit has increased R and D spending. One test I applied, for example, was to check in Office of Tax Analysis data as to whether firms that could use the credit to full advantage, essentially those with sufficient current tax liabilities against which the credit could be claimed, showed a higher rate of growth of R and D than those that did not have such current liabilities. The rates of growth, as shown in Table 2, were in fact indistinguishable.

Table 2. Qualified Research and Experimentation Expenditures* by Useability of Credit, 1981

(1) Useability	(2) Qualified Expenditures, 1981 (Millions of Dollars)	(3) Base, 1980 (Millions of Dollars)	(4) Growth Over Base (Percent)
Full Use of Credit	$9,221	$6,576	40.2%
Partial or Zero Use	$4,220	$3,006	40.4%
Total	$13,440	$9,583	40.3%

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*From compilation of U.S. Treasury, Office of Tax Analysis.

Another test I applied to ascertain whether the R and E tax credit was really having any effect was to compare differences in R and D spending for firms which would have been above and below base for the years 1976 to 1980, before the incremental tax credit was in effect, and the years 1981 and 1982 when the credit was operative. In the later years, an effective tax credit should have increased expenditures for firms over base and, if anything, reduced them for firms below base. Thus, if the credit was effective, it should have increased the growth of R and D where it was growing and perhaps decreased it further where R and D was falling. But on this test, again, there was no evidence of effect of the incremental tax credit. The differences between the mean excess of R and D over base and the mean shortfall of R and D below base, as percents of previous R and D, turned out to be no greater, and indeed somewhat smaller, in the years 1981 and 1982 than in the five years before 1981 when there was no incremental tax credit.[2]

Further evidence comes from a 1984 interview survey conducted by the Industry Studies Group, Division of Science Resources Studies, of the National Science Foundation. They reported that only 33 percent of companies, accounting for 22 percent of total company-funded research and development, stated that they were increasing R and D expenditures as a result of the tax credit.[3] This too is no firm indication of the impact of the credit but would hardly seem impressive in view of the possibility that even the 22 percent may be an upwardly biased measure, as self-interested respondents would be more likely to evaluate the impact of tax benefits favorably.

That firms, at least initially, claimed substantial increases in R and D for tax purposes is clear. The initial surge in credit claims offers embarrassing evidence of considerable "creative accounting." Thus, Office of Tax Analysis data indicate, as shown in Table 2, that qualified R and D spending reported by taxpayers increased by 40.3 percent in the latter half of 1981 over its 1980 base. Yet NSF data show total company funds for R and D growing by only 16.2 percent from 1980 to 1981, and the Compustat data pointed to a 14.1 percent overall increase. After restricting the Compustat firms to those with positive R and D growth, to make them comparable to the OTA sample, we still get a growth over base of only 21 percent, roughly half of what firms claimed when they filed with the IRS. There is clearly a strong implication that many business taxpayers were classifying as qualified research and experimentation expenditures in 1981 activities which were not included in calculating the 1980 base. Analysis of McGraw-Hill survey data collected on our behalf makes clear that firms did indeed increase their reports of R and D eligible for the tax credit by more than the increases in total R and D.

IV

Some of the problems with the tax credit for research and experimentation were addressed in its extension. In particular, there was some effort to narrow the definition of research and experimentation. This may reduce the amount of credit claimed for expenditures that have little or nothing to do with technological innovation. How successful the effort will prove is doubtful. The Joint Committee on Taxation estimates the tax loss to the Treasury at $1.4 billion in fiscal 1987. The Treasury also suggested the possibility of indexing base period research expenses to the price level, so that the credit would relate to real increases in R and E expenditures but not those stemming from inflation, but this suggestion was not adopted. At the risk of proving devil's advocate, I would add several other basic amendments.

First, we should eliminate the 100 percent growth limitation, which reduces the nominal credit to 12 and one-half percent for firms increasing R and D most rapidly. While it does not apparently relate to a large proportion of R and D, its negative incentive effects are considerable where it does come into play.

Second, the credit should be made refundable or converted into a direct subsidy. Aside from being aboveboard and allowing the Congress and the public to see clearly what the government encouragement of R and D is costing, a direct subsidy would free government support from the sometimes capricious effects of a tax system already so saddled with "incentives" that may less charitably be dubbed loopholes. Clearly, the current provision discriminates against firms that lack tax liabilities, whether because they are chronically unprofitable, or because they still are new and growing rapidly, or because of substantial indulgence in other tax-reducing activities.

Third, and most important, while retaining the incremental nature of the credit — which may in principle allow it to have a greater "bang for the buck" — we should eliminate the company-specific definition of the base. It is this feature which results in losses in future credits equal to the amounts gained in current credits, and thus may actually encourage some firms to reduce their R and D expenditures.

This provision could be changed by superimposing upon an initial company-specific base, say the average of 1984, 1985 and 1986 qualified R and D expenditures, an adjustment, year by year, calculated from industry or national movements in R and D. Thus, if a firm were in an industry where R and D in 1987 grew by 5 percent, its base in calculating its tax credit for 1988 would be raised by 5 percent from its 1984-1985-1986 average. The firm would then know in 1987 that increasing its current R and D expenditures, while it would contribute some to raising the base and reducing future credits for all firms in the industry, would have a trivial effect in raising its own base and reducing its own future credits. The industry should of course be defined sufficiently broadly so that no one firm would have a substantial effect on the base. And since the current law already asks firms to report their product lines there would be virtually no additional burden on the taxpayer or the IRS in adjusting the company bases in this fashion. Having the base depend upon industry behavior rather than the company's own actions would achieve maximum incentive impact with minimal Treasury tax loss.

V

Even if all of the defects in the current law are corrected, whether a tax credit or subsidy is desirable for R and D expenditures of profit-seeking private firms remains questionable. In general, commitment to a competitive, free-market system dictates a minimum of government intervention. As the

Treasury is now recognizing explicitly in its recent tax reform proposals, this argues, for example, against tax subsidies or incentives for business investment in general. In principle, business will invest in what it finds profitable. Companies should not be offered special tax advantages to invest in what otherwise does not appear profitable.

As I stated at the outset, R and D is admittedly another matter, to the extent that there are unusual positive "externalities," that is benefits which extend beyond those directly involved in economic transactions. That this is true for basic research is clear. It may also be true for some applied research where the fruits in terms of industrial development and ultimate profit are a long way off.

But of some $42.6 billion in total company-funded R and D expenditures in 1983, according to NSF data, less than $1.7 billion went to basic research and only $11.2 billion to applied research.[4] Fully $29.8 billion fell in the category of "development," which in many if not most instances relates to converting research findings into profitable products. These proportions undoubtedly remain the same now. Should not such expenditures be left to the market test of profitability?

Much current research, in agriculture, in defense and in basic sciences is, after all, not done by private business. With regard to the basic research and experimentation where externalities lead us to expect less than optimum private support, we should look to new public support of nonprofit universities and research institutes and to direct government action.

Making the current R and E credit "permanent" and increasing it to 25 percent, however well-intentioned, promise to squander $2 billion per year of tax resources. The results can only be a bigger budget deficit, higher taxes and the sacrifice of potential real support for the research and innovation so important to our economic progress.

NOTES:

*William R. Kenan Professor of Economics, Northwestern University, and President-elect of the American Economic Association. This statement was adapted from from "The R&D Tax Credit: A Flawed Tool." Issues in Science and Technology, National Academy of Sciences, Volume 1, Number 4, 1985.

1. Edwin Mansfield, "Fiscal Policy Toward Industrial Innovation: An International Study of Direct Incentives for R and D," presented at Harvard Business School 75th Anniversary Colloquium on Productivity and Technology, 1984, pp. 28-29. See also Mansfield's "Statement to the House Ways and Means Committee on the Effects of the Research and Development Credit," in Research and Experimentation Tax Credit, Hearings Before the Subcommittee on Oversight, Committee on Ways and Means, House of Representatives, Ninety-Eighth Congress, Aug. 2 and 3, 1984, Serial 98-102, USGPO, Washington, 1985, pp. 142-156.

2. Robert Eisner, Steven H. Albert and Martin A. Sullivan, "Tax Incentives and R & D Expenditures," presented to the Colloque sur l'Econometrie de la Recherche-Developpement, Paris, France, September 9-10, 1983. Also presented at 16th CIRET Conference, Washington, D. C., September 21-24, 1983. Published in Leading Indicators and Business Cycle Surveys, Karl A. Oppenlander and Gunter Poser, Eds., Aldershot, England: Gower Publishing Company, Ltd., 1984, pp. 385-419. Reprinted in Research and Experimentation Tax Credit, op. cit.; see Table 3.22, p. 124. A shorter version appeared in the National Tax Journal, as "The New Incremental Tax Credit for R&D: Incentive or Disincentive?", June 1984, pp. 171-83.

3. Science Resources Studies Highlights, NSF 84-329, October 15, 1984.

4. National Science Foundation, Research and Development Industry, 1983.

STATEMENT OF DR. MARTIN BAILY, SENIOR FELLOW, THE BROOKINGS INSTITUTION, WASHINGTON, DC

Dr. BAILY. Thank you. I appreciate the opportunity to be able to speak here today. Let me go quickly over the things that I think we all seem to agree on. There is no point in going over them several times.

I think everyone agrees that there is a clear case for providing support to R&D. It is a special activity. It is a virtually unique activity, and without support, not enough R&D gets done. I would disagree, however, in the distinction that is being made between basic and commercial R&D. I think there is a tremendous need to encourage commercial R&D.

The studies by Professor Mansfield and by several other people have shown a very wide gap between the payoff to society from commercial industry-performed R&D and anything that the firm itself gets. That gap is very large, so that even on the commercial end, there is a tremendous need for some kind of incentive. That is where taxes should be used appropriately. For basic research, direct grants are appropriate.

I think one also needs to emphasize that at this time of economic crisis for our country, that these things are a matter of very great urgency. We have had very little productivity growth. We clearly have a competitiveness problem that needs to be dealt with. So, the matter of encouraging technology is one of tremendous urgency I think for Congress.

The other point I would like to make in a general way is the need for industry/university cooperation. I think that is an important feature of what we are doing in the 1986 to 1988 period. There is no question that the United States is absolutely unexcelled in its basic science and its basic research. Where we often seem to have fallen down is in translating that into a commercial payoff, into products and processes that could compete with the rest of the world and, particularly in the last few years, with the Japanese.

I think that one thing we need to do is to make sure that the benefits of a lot of those brilliant minds—those brilliant scientists we have—that those benefits really do accrue to our country, our workers, and our companies.

Now, on the question: Does the credit work? Again, let me agree with some of the things that have been said. There are some perversities in the way the current credit is structured. I think there is scope to overcome those perversities. I don't want to get into a detailed debate about how to do that.

I would simply say I do disagree with the particular proposal that Professor Eisner has made because a company that maybe falls behind the industry for a while, then has a very difficult time catching up and getting the credit. But nevertheless, let me stress my agreement there with taking a hard look at the structure of the credit, seeing if we can make it more effective. I do disagree very fundamentally, and here I think with all due respect that Professor Eisner is dead wrong; and that is that I think the credit that we had from 1981 to 1985 was effective.

First of all, it provided a somewhat greater incentive than I think he says because it does interact with the corporate income tax. Through the corporate income tax, the Government in a way takes a partial stake in every R&D project through the expensing provision. So, the incentive really was close to seven percent. It is closer to four or five percent now, so unquestionably it is lower now; but I think the earlier credit did provide a noticeable and effective incentive for R&D.

I think that incentive translated into higher R&D. I think if you look at the ratio of R&D spending to output, which I think is an appropriate measure of R&D intensity in these industries—because companies can't fund R&D out of nothing; they can't just keep on growing when their own sales and revenue are not growing. If you look at that ratio of R&D to output, you find that it grew much faster when the credit was in place than in any previous period.

We also, in the written testimony and in the study with my colleague, Bob Lawrence, do some fairly detailed regression analysis. We evaluate the evidence; we look through what Professor Mansfield and what Professor Eisner do, and we come out, I think, very strongly saying that this was not a huge effect, but it was a substantial effect. You got more increase in R&D—more dollar increase in R&D—than you lost in tax revenue.

You know, you can always find some explanation. You can say, well, they would have done this anyway; but how do we evaluate policies? I think we evaluate them by saying: Did it work? Did R&D grow faster than you would have expected? And I think the answer to that is clearly yes.

I will say a word about the 861 issue. I think it is clear the concern here is that we will discourage companies from doing R&D in the United States and maybe encourage them to do it overseas. I think the Treasury itself in its own study has pointed to that incentive, and I endorse what they say there, with the following caveat.

I think they are a little too hopeful, a little too optimistic about what might happen in terms of moving R&D overseas. In the past, other countries just didn't have the capacity to do a lot of R&D. Most R&D was concentrated in the United States. I think that is not true any more.

We have seen companies move production facilities overseas. I think it would be a tragedy if we encourage companies to move their R&D facilities overseas.

Let me, in closing, make the following sort of general statement. Obviously, there is some doubt. There is disagreement, and you have heard it here, about the effectiveness of the credit. Where do the risks lie? Do they lie in reenacting a credit, perhaps a permanent strengthened credit? Or do they lie in doing nothing?

I think the risks lie in doing nothing. I don't think we can afford to do nothing. I think we have to send the signal from Washington to business that this is a vital activity, and we want to encourage it.

Thank you.

Senator BAUCUS. Thank you, gentlemen.

[The prepared written statement of Dr. Baily follows:]

Statement of Martin Neil Baily[1]

Senior Fellow

The Brookings Institution

before the

Subcommittee on Taxation and Debt Management

of the Committee on Finance

United States Senate

April 3, 1987

To justify reallocating using tax policy to foster a particular activity, the social benefits from it should exceed those obtained elsewhere in the economy. Government support for industrial R&D meets this strict test. If we move resources from some other profitable activity into expanded R&D spending, society as a whole is better off.

When a company develops a new product or process, the benefits spill over outside the company in ways for which the company itself will not receive payment. Competitors will copy the new technology. In response, the company will be forced to lower its prices. Research and engineering staff will leave to join other companies or set up their own, taking their knowledge with them. For these reasons the innovating company cannot "appropriate" all of the returns to its own R&D. Some of the benefits accruing to its competitors, its customers and its employees will not be paid for. As a result, firms will spend less on R&D than would be desirable from the perspective of society as a whole, unless there are additional incentives from the government.

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[1] This statement was prepared jointly with Robert Z. Lawrence of the Brookings Institution. The views expressed do not represent those of the Brookings Institution, its officers, trustees, or other staff members. It draws on a longer study, Tax Policies for Innovation and Competitiveness, prepared by myself and Dr. Lawrence that was commissioned by the Council on Research and Technology. References to the work cited in this testimony can be found in this longer study.

Some economists acknowledge the case for government intervention but believe that government support should be concentrated on basic research. There is a need to support basic research, but the evidence suggests that, in the United States, firms do not engage in sufficient commercial R&D spending. Although they use different methodologies and data samples, most studies have reached the same conclusion: Industrial R&D has social returns that far exceed the returns from other kinds of investment.

Three complementary studies of this question, all commissioned by the National Science Foundation, are particularly noteworthy. Professor Edwin Mansfield and his associates at the University of Pennsylvania analyzed detailed data on a sample of seventeen typical innovations. They found that the median project in their sample had a rate of return to the firm undertaking it of 25 percent. However, once they took into account the benefits accruing to other firms and consumers, they estimated the median return to society to be 56 percent. In a study of 20 innovations Robert R. Nathan Associates found the median social rate of return to be 70 percent about twice the median private rate of return. A similar investigation by Foster Associates obtained even higher estimates of the difference between private and social returns. Their median innovation had a social rate of return of 99 percent and a private rate of return of 24 percent.

Competitiveness and Industrial Technology

The current state of the United States economy has made the need for exploiting the potential of programs to stimulate R&D particularly urgent. There is a national consensus that recent U.S. economic performance has not been satisfactory and this idea has been expressed in terms of America's declining competitiveness. At least three aspects of the competitiveness issue require an enhancement of U.S. industrial technological capacity.

•Productivity Growth Perhaps the most serious and perplexing national economic problem has been the decline in overall productivity growth in the U.S. economy since 1973. Ninety percent of the goods and services we buy are produced domestically, so that improving productivity at home is the key to improving living standards. The private business sector of the economy would be producing about 30 percent more output than it is now had the pre-1965 growth trend continued. Most economic studies suggest that the dominant source of productivity growth in the past has come from improvements in knowledge. Thus increasing R&D spending is one way to reverse the decline in growth.

•Is the United States Number 1? In the 1950s, the United States was clearly the preeminent global economy. U.S. living standards were almost twice as high as those in Europe, almost eight times as high as those in Japan. The U.S. lead rested predominately on superior know-how and skills. Today, the U.S. economy is no longer clearly pre-eminent. Studies suggest U.S. living standards remain higher than those in Europe and Japan, but the lead is no longer overwhelming. In some industries, American productivity levels lag behind our foreign counterparts. These shifts in productivity, reflect in part the relatively greater commitment by foreign firms and governments to industrial R&D spending. Measured as a share of GNP, U.S. total spending on R&D is similar to that of Germany and Japan. But, since a high proportion of the U.S. R&D effort is spent on defense and space, the United States share spent on civilian R&D (estimated by the National Science Foundation at 1.89 percent of GNP in 1985) is considerably lower than that of Germany (2.47 percent of GNP in 1983) and Japan (2.60 percent of GNP in 1983). In addition, because of stepped up efforts by foreign governments and firms, the gap in the share of GNP devoted to commercial R&D between the US and other major industrial nations has widened.

The convergence of foreign industrial economies to US productivity levels was to some extent inevitable. It is easier to copy than to innovate. But nonetheless, this new global environment requires new policy approaches by the United States. We can not take our technological superiority for granted. Technological leadership has foreign policy and defense implications which are more difficult to quantify than economic spillovers but are no less real. An optimal national response requires nurturing our domestic industrial technological capability.

•Trade Performance: Continued innovation is essential if the United States is to remain internationally competitive. Since U.S. labor costs are high, American firms must compensate for their higher costs with higher productivity and superior products. These in turn depend on technological innovation. Indeed, technology-intensive products have made a disproportionately large contribution to U.S. trade performance, and one that has been rising over time. At the same time as the American global dominance of high-tech activity has been eroding, the US has become increasingly dependent on high-tech exports. In 1985, high-technology products, as defined by the Commerce Department, accounted for 42.2 percent of US exports of manufactured products. This has increased from 35.2 percent in 1970. In contrast to the long term decline in the U.S. trade balance in non-high technology products, the U.S. trade balance in high-technology products increased from a $6.1 billion surplus in 1970 to a $25.5 billion surplus in 1980. Since 1980, the strong dollar has helped create a huge overall trade shortfall and has pushed even our high-tech trade towards deficit. But now that the dollar has come down, it is essential that we regain our trade surplus in high-tech products. And we cannot rely on the fall of the dollar alone to do this. Paradoxically, technological competition will actually become tougher in the years ahead. Japan and Europe will now step up their efforts to move into the production and export of high-technology goods (which are less price sensitive). Moreover, it is a mistake to think that R&D is only important in certain industries. To improve their trade performance, U.S. industries of all kinds must use leading- edge technologies. To remain competitive our commercial innovative efforts must be sustained and strengthened.

Approaches for Enhancing R&D: The Role of Tax Policy.

U.S. tax policies affect the focus, the location and the amount of our national R&D spending. My discussion in this testimony will concentrate on two particular measures, undertaken as part of the 1981 Tax Act. The tax credit for R&D and the suspension of Treasury Regulation 861-8.

The R&D tax credit allowed a twenty-five percent credit for R&D expenditures in excess of the average amount spent during the previous three taxable years. Expenditures qualifying include in-house R&D spending; 65 percent of the amount paid for contract research; and 65 percent of corporate grants to universities and scientific research organizations for basic research. In 1986, the credit was extended until December 31, 1988, but the rate was reduced to 20 percent.

Since 1977, Treasury Regulation 861-8 has required U.S. multinational firms to allocate some of their domestic R&D expenditures against income from foreign sources. The combined effect of this regulation was to increase the effective tax rate on R&D and under certain circumstances, to encourage multinational firms to undertake more of their R&D overseas. The 1981 Tax Act superseded Treasury Regulation 861-8 to allow its impact to be assessed.

DIRECT EVIDENCE ON THE IMPACT OF THE R&D TAX CREDIT

Has the R&D tax credit actually increased R&D spending? There have been several studies of the impact of the tax credit that was in effect from 1981 to 1985. The balance of the evidence from these studies is that the credit has had a positive effect. Nevertheless, because opinion is divided on this issue, Robert Lawrence and I decided to undertake some new empirical research ourselves.

We conclude that the credit clearly has increased R&D spending by U.S. companies. Given the size of the credit, the impact we find is plausible in magnitude. The positive stimulus shows up, both in the aggregate manufacturing data and in the data for most industries. In our judgement, it is hard to review this evidence without concluding that the credit has worked.

R&D Spending Before and After the Credit

The simplest direct evidence on the effectiveness of the credit is to look at whether or not R&D spending grew more rapidly when the credit was in place than it did in earlier periods, taking into account prevailing economic conditions. Over the period relevant for the credit 1980-85 R&D spending grew at 6.4 percent a year overall. This growth rate is almost twice the rate achieved 1960-75. Indeed the 1980-85 period is one of very rapid R&D growth on the basis of any long-run historical comparison.

Critics of the credit have pointed out, however, that R&D spending actually grew slightly more rapidly between 1975 and 1980, the five-year period before the credit was enacted, than it did between 1980 and 1985. However, this criticism neglects the fact that companies have to allocate funds to R&D out of their production revenues. The ratio of R&D spending to production by an industry measures its commitment to R&D. And the rate of growth or decline in that ratio is a much better measure of whether or not an industry is becoming more or less R&D intensive.

The ratio of R&D spending to output, during the period when the R&D tax credit was in effect, grew more than twice as rapidly as it did in the five years prior to enactment of the credit. Judged by the ratio of R&D to output, American industry is 20 percent more R&D intensive than it was in 1980 and this surge is pervasive, with gains exceeding 10 percent in 8 out of 12 industries.

Industrial production grew 30 percent from 1975 to 1980, as the economy recovered from the 1975 recession. By contrast, production grew only 17 percent from 1980 to 1985, as the 1982 recession and the rising value of the dollar cut into the sales of U.S. manufacturers. It is amazing how rapid the growth was in R&D spending 1980-85 given the difficult economic circumstances.

Regression Analysis of Aggregate and Industry Data

Taking the ratio of R&D to industrial production may be too simple as a way of allowing for other economic forces. Regression analysis provides a formal way of controlling for several factors at once and, therefore, allowed us to separate out the impact of the R&D credit. In addition, it provided a numerical estimate of the size of the credit's effect.

We wrote down a specification in which R&D spending in a given year depends upon R&D in previous years, upon output in the current and the previous years and upon two variables to capture the effect of the R&D tax credit. This specification then allows us to test whether or not the credit increased spending, and if so, by how much. This was tested separately for each of the manufacturing industries for which reasonably continuous data were available from the National Science Foundation. It was also estimated for all industries together. The estimation was made first using a relation which shows the impact of the credit on the level of R&D spending in 1982 dollars. The results indicated that during the years 1982-85 the tax credit increased R&D spending in 11 out of the 12 industries studied. Depending upon whether we added the results for the individual industries or estimated an industry-aggregate relation, we found that the credit added between $2.6 and $2.9 billion a year to R&D 1982-85. The figures for 1981 were between $1.3 and $1.8 billion.

We also estimated a logarithmic specification that assumes that the credit changes R&D spending by a given percentage rather than by a dollar amount. Again the results were very good. Only two industries showed perverse effects for 1982-85 and neither is significant. Overall, there was a strong positive effect of the credit. It led to an increase of a little over 7 percent in R&D spending. Since the industries in the sample spent about $40 billion in 1982, this figure corresponds well to the previous results. The increase in R&D generated in 1981 was again about two-thirds the size of subsequent effects.

Taken as whole the results of our statistical investigation of industry R&D data provide striking support for the view that the credit has increased R&D spending. The effect is extremely pervasive, affecting almost all the industries covered. It is quite substantial in magnitude, given the small size of the credit and the acknowledged problems that the credit has because of its moving company-specific base. The magnitude is not so large as to be implausible, however. The credit represented an incentive of about 7 percent. Thus our results indicate that the elasticity of response of R&D was about unity and that the credit generated about two dollars of R&D for each dollar of lost revenue.

The Impact of Defense and Competitive Pressures

It has been suggested that the increase in R&D spending that took place 1981-85 was caused not just by the credit, but other factors. In particular, some companies may have stepped up their own R&D in the hope of winning defense contracts. Others may have responded to the pressure of increased foreign competition. However, the analysis of R&D by industry described above did not indicate that industries that were heavily involved in defense research showed above average increases in R&D over the credit period. Nor were the increases in R&D restricted to industries under competitive pressure. The transportation equipment industry provides an informative example. This industry consists of automobiles (facing intense competition) and aircraft and missiles (where the Defense Department is the biggest customer). The industry increased its R&D by 5.8 percent 1982-85, less than the average of all industries. Much of the R&D in the automobile industry is considered ineligible for the R&D tax credit by the IRS, so that the behavior of this industry is consistent with our conclusion that it was the credit and not other factors that made the difference. In general, the pervasiveness of the impact across industries that we found supports the interpretation that the credit was at work.

Conclusions from the Empirical Investigation

The data we have examined provide the best hard evidence there is. The results suggest strongly that the credit has been effective. The ratio of R&D spending to output grew much faster during the period the credit was in place than it did in prior periods. The impact of the credit in raising R&D shows up strongly and pervasively in data on the main industries that perform R&D.

THE R&D TAX CREDIT: SOME POSSIBLE OBJECTIONS

The R&D tax credit appears to be an appropriate mechanism for closing some of the gap which exists between the private and social rates of return to R&D. It is designed to raise R&D spending at the margin, to ensure that such spending responds to market forces, and to encourage further cooperation between business and other research organizations. And it appears to have worked. Nonetheless, the credit has been subject to numerous criticisms.

The Limited Size of the Incentive Effect

The credit was criticized because it provided a fairly small incentive to expand R&D. This is basically correct. However, the credit also involved a relatively small revenue loss to the Treasury. Its costs were between $1 and $2 billion. A relatively small incentive was unlikely to bring about a massive change in corporate spending. The real question is whether or not it was cost-effective and in our view it was. Taking into account the way the base-level of R&D is computed, the credit created about a 7 percent incentive for R&D over the 1981-85 period. Creating a 7 percent incentive from such a small revenue loss was pretty good. When this is combined with the fact that the rate of return to society from corporate R&D is between 50 and 100 percent, then even very conservative estimates of the response of R&D to incentives mean that the credit was a good buy for taxpayers.

If the 1981-85 credit was too small, then the solution would have been to make it larger. Unfortunately, the opposite has happened. The credit now in effect provides only about a 5 percent incentive, because of a lower statutory rate and because of the reduction in the marginal rate of corporate income taxation. Accordingly, it is to be expected that there will be a reduced effect of the credit over the years 1986-88.

Revising the Structure of the Credit

The National Science Foundation, relying on a study it commissioned from Charles River Associates, Inc., has criticized the current design of the credit and recommended a revision of the rules for computing the R&D base. They propose moving to an "index-based" structure. Under such a scheme, a company would still claim the credit on the basis of the increase in its R&D above a base level. But the base would be computed from its spending in a fixed period, say 1981-83. Increases in the base would then be tied not to the company's own spending in future years, but rather to some general index such as inflation or general economic growth.

We think that such a revision does hold some promise for improving the effectiveness of the credit. Indeed similar views are held by critics of the credit such as Robert Eisner and skeptics such as Edwin Mansfield. Such changes in the base would remove the perverse incentive created by the current structure of the credit, under which a few companies may be better off temporarily to reduce their R&D spending in order to reduce their base for future credits. The analysis by Charles River Associates claims that the effectiveness of the credit can be quadrupled by restructuring. This claim is somewhat strong because in the face of large outlays for R&D, industry returns are likely to diminish, hence damping some of the incentive effects. In short, we are sympathetic with these suggestions for modifying the credit, but we would caution that simply modifying the definition will probably not suffice. The major question for the future is how to increase the size of the credit. It is worth exploring alternative structures for the credit. But changing the formula is not a substitute for increasing the dollar commitment to helping R&D deal more effectively with our problems of slow productivity growth and reduced competitiveness.

Reclassification of Expenditures

Some critics have argued that the credit is fine in principle, but in practice, it provides an incentive for companies to reclassify as R&D other expenditures that they were making anyway. Robert Eisner, in particular, has drawn this inference from data supplied by the Office of Tax Analysis. Eisner and his co-authors examined the R&D expenditures that companies were claiming on form 6765. They found that the average rate of increase in R&D in 1981 (based upon the 1981 claim relative to one-half of 1980's expenditure), was much higher than the rate of growth of R&D expenditure from other data sources. They also noted that ineligible expenditures actually fell between these two years and conclude that the increase in eligible expenditures was due to reclassification.

Instead of indicating a major problem with reclassification, evidence of a surge in spending eligible for the credit could actually indicate the credit was highly effective. When a subsidy is introduced for a particular activity, it is precisely the intention of the policy to induce firms to expand those activities eligible for the subsidy, perhaps at the expense of other, less important activities. One might interpret the evidence as showing that the companies that filed for the credit did indeed respond to incentives. Nonetheless, it is possible, of course, that the OTA data do reflect some reclassification of expenditures.

The implications of such reclassification for the long run cost-effectiveness of the credit are not particularly great. The regulations on eligibility were still being prepared when companies completed their 6765 forms for 1981. Companies did not know exactly what was eligible and what was not. Certainly they wanted as big a credit as possible and they included any expenditures that might qualify. By law, any substantial corporation is subject to audit. The data in the OTA file reflect pre-audit numbers that were very preliminary and that had only a limited relation to the amount of expenditures that will be finally approved for the credit. Once the tax process has had time to work through, the reclassification problem will certainly be much less than it would seem from the OTA file.

Most importantly, however, companies that erred by reclassifying in 1981, derived rather small benefits and cost the Treasury no revenue over the medium run. Professor Eisner has shown that because the amount of R&D claimed against the credit in 1981 was then included in the base for the next three years, it turned out that the total amount of revenue loss to the Treasury from the R&D credit was smaller if companies claimed large expenditures in 1981 than if they claimed small expenditures.

The 1981 case was somewhat special, because of the uncertainty associated with initiating a new program. But there is an important general point here. The credit is partially self-policing. Reclassifying expenditures as R&D provides only a one-time advantage at most. It is virtually impossible for a company to keep on reclassifying expenditures more and more each year. The extension of the credit for 1986-88 tightened the eligibility rules for R&D and, given this, the issue of reclassification is of far less significance.

Some Authors Argue the Credit Has a Small Effect

I stated earlier that the balance of the evidence available supports the view that the credit has had an effect in encouraging R&D spending by U.S. corporations. This statement was based upon objective surveys of the literature by Jane G. Gravelle, for the Congressional Research Service; Kenneth Brown, for the Joint Economic Committee; and Joseph Cordes, for the National Academy of Sciences. All three conclude that the credit has had a modest but positive effect on R&D.

The major reason for the caution shown by these authors in evaluating the evidence supporting the credit is that studies by Edwin Mansfield suggest the credit's impact was modest, while Robert Eisner is skeptical that it has had any impact at all.

Mansfield surveyed about 800 companies and asked them retrospectively how much they would have reduced their R&D spending in the years 1981, 1982 and 1983 in the absence of the credit. The responses show the credit with a small effect, although one that is rising over time. By 1983, the responses indicate that R&D would have been decreased by 1.2 percent in the absence of the credit.

One can look at this evidence in different ways. The response found by Mansfield is small, but it is positive and it is statistically significant. Since the social return to R&D is so high (between 50 and 100 percent according to the studies cited above), even a response as small as this indicates that each dollar of lost tax revenue going into the credit yielded a social rate of return of between 22 and 45 percent. That means that even taking Mansfield's results at face value still makes the credit a good investment for taxpayers.

Robert Eisner's analysis is interesting in that even though he interprets his evidence as indicating that the credit is ineffective, he reports some results which indicate it may have had an impact.

One piece of his evidence has already been described above. Eisner finds in the OTA data that companies that applied for the credit had a much higher rate of growth of their R&D than the general rate of increase. As I have said, this could indicate the positive impact of the credit. Eisner dismisses this result as caused by reclassification, but this is not certain. Probably there was reclassification, but probably there was a real increase too.

Eisner also uses the OTA data to compare the behavior of companies which had enough income to make use of credit with those unable to use their credits because of insufficient taxable income. Eisner finds no evidence of a difference in R&D behavior between the groups. There is an obvious explanation for this, however. The credit can be carried forward or back, so that nearly all the companies could in fact take advantage of the credit. One would not expect to see big differences, because the OTA data are probably inappropriate for this test. The file included too few companies who did not plan to make use of the credit. Indeed, all the companies in it applied for the credit, so presumably they all planned to take advantage of it at some point.

Kenneth Brown in his study for the Joint Economic Committee points out that in Eisner's testimony to the House Ways and Means committee his same test is applied to companies in the more comprehensive Compustat data file. This does indicate substantial differences in R&D spending between companies with either full or zero eligibility for the credit. In 1983 R&D spending by companies apparently fully eligible for the credit rose by 30.4 percent, whereas spending by those ineligible rose by only 11.1 percent. Quite a difference! In 1982 the comparable figures are 29.5 percent and 19.6 percent and in 1981, when the credit was only partially in effect, they are 39.5 percent and 33.8 percent. We have used a sample of 172 firms from the Compustat file and find that in 1985 those eligible for the credit raised their spending by 10.3 percent compared with a decline in spending of 5.5 percent of firms that were ineligible. We do not say that this test proposed by Eisner is an ideal one, nor are the Compustat data an ideal source, but these results certainly do not refute the argument that the credit raised R&D spending.

Conclusions on Possible Problems with the Credit

I agree that the R&D tax credit is not providing a large enough incentive to companies to expand their R&D. Unreasonable expectations about the size of the incentive that could be created for a given revenue loss were generated when the credit was initially introduced. There are now proposals to redesign the credit in order to make it more effective. I judge that these proposals have some merit, but claims for what can be achieved by a simple fix in the formula should be cautious. In order to provide a substantial stimulus to R&D, there will simply have to be more tax dollars committed.

There is always a legitimate concern about classification errors when a tax credit is enacted. I agree with Professor Eisner that when companies first filed claims for the credit in 1981, some sought existing expenditure that could be classified as R&D. Some reclassification probably also occurred in 1982. This problem has much less severe consequences than are alleged, however. First, the extent of excess claims was certainly reduced by the audit process once the regulations were clarified. Second, the new credit for 1986-88 has tightened the eligibility requirements. And third, reclassification does not pay in the long run. In fact, companies that claimed excess expenditures in 1981 gained nothing.

The results of the analysis presented in the previous section indicated that the credit had a powerful impact. The main studies cited by critics of the credit are those of Mansfield and Eisner. My reading of their evidence is that it certainly does not refute what

Robert Lawrence and I found. Indeed, some of their evidence supports our conclusions.

MULTINATIONAL COMPANIES AND THE TAXATION OF R&D

I have pointed to the stiff global competition that the United States faces in the technology area. Other countries are catching up or even pushing ahead of us in their technology development. An important aspect of this global competition is that U.S. multinational corporations have a major stake in the economies of Europe, Canada, and increasingly, Southeast Asia. Companies with a global reach are able to respond to incentives in ways that are impossible for national companies. Many multinationals have moved to take advantage of low-cost production facilities overseas. As yet, design, administration and R&D functions remain primarily within the United States, but this may not be so in the future.

In 1977 new regulations were put forward that would require multinational companies to allocate part of the R&D performed in the United States as an expense against foreign-source income. These regulations were suspended in 1981, but may be put into effect now. Since no foreign government allows R&D performed in the United States to be deducted from the foreign taxable income of the subsidiary of a U.S. multinational, the new regulation (861-8) would increase the total tax liability of some companies. Those affected are the ones with excess foreign tax credits.

Problems with Section 861-8

There are serious problems caused by disallowing the full deductibility of R&D as proposed under section 861-8. The rule works best when a multinational expects to receive royalty payments from its foreign subsidiaries that reflect a fair market return on the value of the technology that is to be supplied. In this case the royalties will offset the overtaxation of its R&D. Even in this favorable case, however, there are some disquieting elements. First, there is not an offset of the risks involved in research. The tax penalty is paid whether or not the research is successful. And the majority of R&D projects are not successful.

Second, there will be a distortion of the kind of R&D the company will perform. The tax penalty on R&D does not depend upon the goals of the R&D. This means that R&D whose returns are to be gained only in the domestic market will be penalized under 861-8, but will not generate any foreign royalties. Companies, therefore, will be encouraged to perform research that raises productivity or generates sales for their foreign affiliates.

These problems arise in the case where fair royalties are paid, but what happens if foreign governments refuse to allow them? Foreign Treasuries see royalties as a device to reduce the taxable income of the subsidiaries of U.S. multinationals that are based within their borders, and hence reduce their tax revenue. They are likely to restrict royalty payments in the future even more than they have in the past because the United States has reduced its corporate income tax rate. The result of this is that the foreign income of U.S. multinationals subject to foreign tax will be inflated and the companies will pay too much foreign tax. The effect of 861-8 is then to force the multinationals to bear the cost of this excessive foreign taxation by disallowing the full U.S. R&D deduction. The companies would face a double tax burden.

The response of the U.S. companies to this overtaxation will be to cut back on their U.S. R&D, where the costs are not fully deductible, and expand R&D overseas where they are. It is ironic that if foreign countries overtax U.S. multinationals, we propose to respond by encouraging companies to move R&D facilities to these countries.

In June 1983, the Treasury issued an economic analysis of the Section 861-8 regulation. This study did acknowledge that 861-8 discourages R&D in the United States and encourages a shifting of R&D to foreign countries, and it also made estimates of the size of the response. It found that regulation 861-8 would cut domestic R&D substantially. The Treasury findings indicate that any increase in tax revenue from 861-8 would probably come dollar-for-dollar out of a reduction in U.S. R&D spending.

Industrial R&D done in the United States is a vital component in maintaining a dynamic national economy. It is important to have a strong and growing base of domestic R&D that generates the ideas and interactions that benefit the rest of the U.S economy. They are a key to our high standard of living. There is a national interest in supporting the domestic R&D base, that must be considered when deciding how the general principles for taxing multinationals are applied to technology development. In view of this, I would argue that the rules on deducting R&D expenses for U.S. multinationals should not impose a significant penalty on R&D performed in the United States, nor should they significantly encourage shifting R&D to facilities overseas.

CONCLUDING COMMENTS

The national benefits from increased R&D spending are so high that the United States should dramatically increase its government efforts to stimulate it. Most studies of R&D policy, caution, however, that no single approach should be relied upon. Instead, a variety of complementary instruments ranging from grants and direct support of research laboratories, to indirect mechanisms such as patents and tax incentives all have a role to play. As one moves closer to the commercial end of the technology process, the need for ensuring the research is market driven increases. Tax incentives that are market driven are more likely than government decisions to fund projects attuned to concrete economic needs. Tax incentives that affect marginal spending decisions will have a greater incremental impact on spending than grants programs. Government should not focus exclusively on basic or applied research and development, but should provide incentives for each, in addition to forging closer links between industry and research organizations to ensure the rapid diffusion of both knowledge and an appreciation of where new knowledge is most needed. The new Basic

Research Credit which allows companies to claim a 20 percent flat rate credit against grants for basic research is an appropriate means of forging such links.

In my view, the tax measures first enacted in 1981 were an appropriate means for stimulating U.S. R&D. While they entailed a relatively small commitment of resources, their benefits outweighed their costs. Given the relatively sluggish growth of U.S. production over the period 1981 to 1985, U.S. industrial R&D spending has been significantly stronger than might have been expected. Given the high social payoff from R&D, even the extremely conservative findings of studies which have argued the credit's impact was small, indicate it was worthwhile.

Suggestions for changing the definition of the credit's moving base should be investigated in order to increase its effectiveness. But I stress that a reversal of the competitiveness and productivity problems of the U.S. economy, cannot be done on the cheap. An increased permanent and restructured R&D tax credit should be one part of a national effort to allow the U.S. economy to achieve its full potential.

Senator **Baucus**. Professor Eisner, some people suggest that the credit rewards companies for efforts they would undertake anyway. Do you agree with that?

Professor **Eisner**. Yes, I do.

Senator **Baucus**. Why do you? What is your best argument for that proposition that the credit just gives money to firms that would engage in that research expenditure anyway?

Give me your best argument.

Professor **Eisner**. The best argument is the analytical argument of the nature of the credit which I suggested: that it does not really offer firms any significant incentive; but I suspect that the most convincing argument to many people might be a rather revealing survey done by the National Science Foundation Industry Group—I forget the title of it—a couple of years ago now, in which they asked the people in the industry: Has the credit affected your R&D spending?

And as I indicate in my statement, the respondents for firms doing only about 22 to 23 percent of R&D in the country said it affected their R&D spending in any way.

And now that, I suspect, may be an exaggeration because, with all due credit to people's integrity, there is a certain amount of self-service if you are in an industry doing R&D; you ask if this is furthering the R&D spending, and they are likely to say yes, but those were not the results that came out.

Senator **Baucus**. Dr. Baily, I assume you think that the credit does not reward companies that would spend the money, anyway. So, what is your response? What is your best argument that it in fact does provide an incentive to spend for R&D which the company would otherwise not spend if the credit were not there?

Dr. **Baily**. I think if you look at the evidence, and it is set out in more detail in the testimony, I think we do find rather convincing evidence of an increase in R&D. Any incentive has to work at the margin. We are not saying that major projects necessarily are started from scratch, but projects will be expanded. Companies will be willing to take on somewhat riskier projects than they would have, and I think the statistical evidence is very clear that it did help.

Even the survey that Professor Eisner has referred to showed some response—not a huge response, but it did show a significant, positive response.

So, I think as we review the evidence that the credit is helping. It is not a huge credit, and it is not going to change the world because of its small size, but it certainly was a help.

Senator **Baucus**. You had better explain why it was a help.

Dr. **Baily**. It is hard to do it without reviewing the sort of statistical evidence in more detail than I think we want to get into in the debate here; but I think I mentioned the points that we looked at. We looked at an equation which tries to predict what companies would have spent in the absence of the credit. We tried to take into account the factors that they might have taken into account, what the historical record told us these companies would have spent over that period in the absence of the credit.

Then, given that, what did the credit do? And we found a strong effect that it added about seven percent to the spending of those R&D companies.

Senator **Baucus**. I would like to ask each of you your feelings about giving grant dollars to research as opposed to a credit. Some suggest that the grant method is more efficient in a certain sense, but others suggest that the market should decide where the research dollars should be spent rather than, say, a Government agency. I would like each of you to address that question.

What about the propriety of grant dollars instead of credit?

Professor **Eisner**. You have raised a very serious problem. We certainly do want to try to get the market to offer the tests wherever we can. The basic problem is that on the R&D that is not basic, there is a market test; and then there is no reason, I would think, to give a further subsidy. Now, on grants, I think we have to come down in the form of grants. We may be able to devise some techniques of subsidies for basic research, not merely on a tax credit but on direct subsidies, not necessarily giving them the entire grant; but if a company is going to do it, for every dollar they spend on basic research maybe the Government could give them 50 cents or something of that kind.

Understand that the great bulk of basic research and much research is currently done not with market incentives; it is done by Government. Certainly, in the military, it is done with Government support. It is done with Government support in agriculture where it has been tremendously successful. There is, of course, a great deal in the way of grants in research in health and all kinds of research in universities and nonprofit institutions. Here, I guess, I should confess that maybe I am self-pleading, but I think that is the way to go.

Senator **Baucus**. Are you saying that no grant makes sense, or that no credit makes sense, or only that some credits—R&D credits—-make sense? Are you against all R&D tax credits?

Professor **Eisner**. I could support an R&D tax credit for basic research if it were limited to that.

Senator **Baucus**. To what?

Professor **Eisner**. To basic research.

Senator **Baucus**. Are you saying there are no externalities with other research?

Professor **Eisner**. It is unconvincing that there are significant externalities. You know, you ask the people at General Motors or IBM which are getting huge dollars out of this, do we really believe that IBM is not going to do necessary research unless it gets the credit? It is in a terribly competitive market. If we believe that about American industry, then we are in bad shape.

Senator **Baucus**. My time is up, and I will address the same question to you, Dr. Baily, in the next round of questions. Senator Danforth?

Senator **Danforth**. Dr. Baily, assume Secretary Mentz were to call you up and say, look, we are putting the finishing touches on the R&D credit, and we would like you to make any suggestions you could for improving it, changing it, or, if you wanted to, you could just suggest that we stay with what we have now. How would you respond.

Dr. Baily. I would suggest, first of all, that—I think I would probably endorse the proposal coming from the National Science Foundation, that we move to an index base structure so that we set the base for a company at, let's say, its 1981-1983 average level of spending, and then the increase in the base comes not through the company's own R&D but rather through some general index, and that would either be perhaps the rate of inflation or the rate of growth or something like that-generally of growth. I think that would——

Senator Danforth. The general rate of growth in the economy?

Dr. Baily. Yes. I would like to see a larger credit and I realize the budgetary climate makes that very hard; but given whatever revenue constraints were imposed, I would like to see a larger credit.

Senator Danforth. There were a couple of reasons back in 1981 for using the incremental rates. One reason was the budget effect. We wanted to keep the cost as low as possible. A second reason was not to reward——

I would hope that you, Dr. Baily, and Professor Eisner would feel free to send to the Treasury any suggestions you might have. I do think myself that the R&D tax credit is important. I also support research grants, Professor Eisner. For somebody who has absolutely no understanding of science, I take it as a matter of faith that it is very good for the country, and that we should be encouraging it and definitely encouraging it by way of grants.

I think one of the problems is that recently the research being conducted in this country has had a negative effect on those of us in Government. With respect to university grants, Congress has earmarked those grants for its own purposes; that is, instead of awarding them on the basis of the qualifications of the university we have awarded them based on which State the university is in. In last year's tax bill, we did a number of things, including the sunsetting of the R&D credit and capping the tax exempt bonds for our leading research institutions.

I would think that if, on top of all of that, we let the R&D credit expire, the aggregate effect of all of these things we are doing to research is negative.

I would like to see the credit kept alive and at 25 percent, or restored to 25 percent. I might say that my understanding of the difference between 20 percent and 25 percent over a four-year period of time is about $1 billion. Is that your understanding?

Dr. Baily. Yes.

Senator Danforth. About a quarter of a billion a year?

Dr. Baily. That, I believe, is the estimate from Treasury.

Senator Danforth. Thank you.

Senator Baucus. Thank you, Senator Danforth. Senator Chafee?

Senator Chafee. Thank you, Mr. Chairman. Let me just give my thoughts here, and see if you can take a part. We read in Dr. Baily's statement on page 4 that U.S. civilian R&D is relatively modest, compared to our trading competitors. Germany is 2.47 percent of GNP and Japan is 2.6 percent, and the U.S. is 1.9 percent. So, I start with the premise that we have got to do something. Now, you also agree with that, and you say the way to do something is to increase direct grants.

Grants might help IBM in their type of research but would be useless to Hewlett-Packard who is doing something quite different. Therefore, it seems to me that letting the tax credit function is better because it applies to each individual company: Each company can therefore compete along the lines they want. In other words, the credit applies to all companies, rather than a grant which might not help some companies at all. That is the first point.

The second point is that since it is incremental, it is relatively modest.

The third point is that the people who are involved out there on the firing line—whether it is the AEA or the individual companies—state that their highest priority is making the R&D tax credit permanent. They didn't quarrel so much about the 20 and 25 percent; they wanted the permanence. When we had lots of other things that seemed far more appealing, that was their goal. Could you comment on those points and give me your reaction.

Professor EISNER. First, I have to confess that I start with a prejudice, which I think most of us have, but maybe I apply it stubbornly. I believe in leaving things to the free market unless we have a good reason to intervene, or unless we have to countermand somehow some other Government intervention which is making things nonoptimal. If I hear that American firms are spending less on R&D than German firms, I conclude that each firm decides what it is spending on depending upon what the industry is and what its needs are.

I might say that part of the picture here is blurred by the fact that the United States at the Government level and particularly in its defense industries is spending a huge amount on research. The whole SDI program uses research resources in the billions of dollars, and I think the Congress might want to take a look at that; and that, to the extent you are drawing resources into military purposes, you may actually be weakening the strength of the country by taking research resources away from elsewhere. It is not only the money involved; it is all the people involved.

Now, beyond that, on the matter that some people say that this is very important, I don't know quite how to answer that. I mean, there are, depending on one's estimate, one billion or two billion dollars at stake, and that is going to get people interested. It is going to get lobbying organizations interested; it is going to get them to set research teams going to try to show the benefits of it. They will hire lots of economists and lawyers and so forth; it builds up a head of steam. People become interested, and they have devoted years to advocating it; but I think the hard fact we have to look at is if this particular legislation is effective and what is it effective for?

Is it effective for things that Government has an interest in intervening in the market for? And I would say that that is true only to a minimal extent, and I have to insist and I am sorry that you didn't get more of my associates in economics and elsewhere who have studied this who have not been working for any interested party, and I think you will find that they come to similar conclusions. I welcome Dr. Baily's statement about the basic infirmity of this in terms of the company base.

And yet, the Congress, I must say, despite all the testimony, renewed it in the same form as previously. The National Science Foundation knows it now; I don't think their inflation base is the best way to go, but the inflation adjustment is at least a considerable improvement over what you have.

Senator **CHAFEE**. I see that my time is getting perilously close here—very close. Thank you. [Laughter.]

Senator **BAUCUS**. Gentlemen, what about our international competitors? What can you tell us about other countries and credits and deductions for R&D that are either more liberal or less liberal than ours and what effect you think that might have on U.S. competitiveness?

Dr. **BAILY**. I think it goes back to the question that was just asked. When we look at other countries who are doing more R&D as a share of output than we are, and I think at least part of that is traceable to the incentives that those countries provide. And we have in the study that has been made available provided a detailed analysis of what other countries do. I draw your attention particularly to the Japanese who have a 20 percent credit; and they believe—their own studies show it is very effective, and it is contributing to their R&D.

It is clear that high tech products are an important part of our exports, with growing dependence on high tech. And if we are going to compete effectively, I think we will have to provide incentives just as other countries do.

And I would just like to restress that even though there were problems with the 1981 to 1985 credit, on our estimates it increased R&D by two dollars for every one dollar that we lost in revenue and that there really is a tremendous payoff to commercial R&D—not just basic R&D. So, if we want to restore our competitiveness, I think we have to look at those facts.

Senator **BAUCUS**. Thank you. Professor Eisner?

Professor **EISNER**. First, Dr. Baily's estimates, I think, are unique. I am aware of no other researchers who have found such large effects; but I might point to the one thing—and I have it in my statement, so I would just remind you—that Professor Edwin Mansfield of the University of Pennsylvania, who is probably the outstanding person in the country devoting his career to the study of innovation and the like and cited by Dr. Baily—has a substantial study of the tax credits in other countries, and I guess I won't burden you by quoting from the statement. He finds that they are relatively ineffective. In a number of countries, they have been cut back or eliminated.

Senator **BAUCUS**. Why do you suppose they have them?

Professor **EISNER**. You know, I don't want to sound cynical. There are lots of things in the tax code in this country and every other country that have been touted as incentives for good; they offer tax benefits. I am not for taxing people, but I think the way to reduce the corporate tax burden of a business is straight-forward, to the extent that we did it in the recent tax reform. You simply cut the rates. As long as you don't cut rates, then you are going to have people saying, well, this is really good for the country; and therefore, we need this benefit.

And you know, every industry can have its claims that this is for defense or this is for progress and give you some special reason why it is desirable. And all of that is a contradiction of the basic notions of our system, that you leave it to the individual company to decide what is profitable, unless there is some compelling social public value that the individual firm will not take into account.

Senator BAUCUS. Dr. Baily, I was going to give you a chance to address the question about the market determining where research should be undertaken with the credit versus research grants which may be in some sense more efficient.

Dr. BAILY. I think there is certainly a case for research grants, and we have them and I think we certainly should continue them. They perform a valuable function in our economy. I certainly don't think we should only have grants, nor do I think such grants are a good substitute for a tax incentive.

I think such grants work best for basic research and for areas where you can use peer review to determine which projects should be done. I don't think it works well as you move towards the commercial end of the spectrum. There, I think, the market forces need to be at work in terms of deciding which projects get done. I think if you gave grants for that kind of research, you wouldn't necessarily do that well in terms of encouraging the overall amount of R&D because you might simply displace projects that were already being done that would then become funded through a grant rather than through the company itself. So, I think tax incentives, where you need the interaction of Government support, plus the market; direct grants where you can use peer review; where it is more basic.

Senator BAUCUS. Thank you. Senator Chafee?

Senator CHAFEE. I have a quick question. Do you know anything about what foreign countries do in these matters? Dr. Baily?

Dr. BAILY. With respect to what, Senator?

Senator CHAFEE. With respect to tax credits for R&D.

Dr. BAILY. Many of the major countries do have R&D tax incentives. I don't have all the details at my fingertips, but they are available in the work that we have done.

Senator CHAFEE. Professor Eisner?

Professor EISNER. I really don't know personally, but I would suggest—I think the National Science Foundation has surveyed it. Also, I would urge you ask Professor Mansfield to submit a statement. He has papers and articles on the subject, and he has studied it very substantially.

Senator CHAFEE. Professor Eisner, I think the point you make about the best thing of all probably being lower tax rates is very interesting. As you know, when we did the tax reform bill last year, we eliminated a whole host of credits—the investment tax credit being the major one. The idea was to bring down the tax rates and let the market work efficiently to direct capital to its most productive use. But also, I think what propelled us into this R&D tax credit is the belief that, as Senator Danforth said, R&D is good. It is something for the welfare of the country, and we ought to make this little extra special effort to encourage it. To me, it is a very modest effort. I mean, when you are talking of R&D at say 20 percent on the increment, that isn't much.

We hope it does some good. Your view is that the research would be done anyway, and all you are doing is giving them a little bonanza for something they would do without the credit. That is the worry that we always have with tax credits around here: Would the job be done anyway? We have had weatherization tax credits. We finally decided that people are going to put storm doors on their house, anyway; so we got rid of it. But I think our rationale here is that this is something special, and we want to encourage it in a modest way. It is a modest effort: $3 billion. I don't want to sound like a callous Washingtonian, but $3 billion in the total picture isn't all that much, if it achieves its goal.

I will be interested to see from the next panel whether they think it has. I suppose they have got a vested interest, but nonetheless, I have respect for them, and I want to hear what they have to say. I want to thank you, Mr. Chairman, and I thank both of the witnesses.

Senator BAUCUS. Thank you, Senator Chafee. I think it is interesting to note that there is a very strong correlation—I think since roughly 1960—between those countries that have higher per capital civilian R&D and those countries with higher growth rates. And I don't know whether there is a causal relationship or whether it is just a coincidence, but the fact is if you plot a line since 1960 of those countries with higher per capita dedication of R&D and along that same line plot countries with higher growth rates, you will find there is a very definite trend.

And I think that Senator Chafee and Senator Danforth are saying there is something basic and fundamental about research and development. It is different from other tax expenditures—other deductions and other credits. That is, R&D is very basic to this country's economy. I cannot think of anything more basic, frankly, than research and development, if we are going to continue to grow as a country and as a people. I appreciate the testimony of both of you. You have been very helpful here.

We will have to now temporarily recess because there is vote going on. I apologize for the vote. I understand that Dr. Mark has a plane to catch. When is your plane?

Dr. MARK. 1:00.

Senator BAUCUS. 1:00? What airport?

Dr. MARK. National.

Senator BAUCUS. All right. We will recess for 10 minutes.

[Whereupon, at 11:11 a.m., the hearing was recessed.]

AFTER RECESS

Senator BAUCUS. The hearing will come to order. Our panel now will include Dr. Joseph Saloom, Dr. Hans Mark, Mr. Dean Morton, and Mr. Ron Pherigo. Why don't you all four come to the witness table, please? Dr. Saloom, why don't you begin?

STATEMENT OF DR. JOSEPH A. SALOOM, SENIOR VICE PRESIDENT, M/A COM., BURLINGTON, MA, ON BEHALF OF THE COUNCIL ON RESEARCH AND TECHNOLOGY (CORETECH)

Dr. SALOOM. Thank you. Good morning. My name is Joe Saloom, and I serve as Chairman of the Council on Research and Technology, called CORETECH. I am also Senior Vice President of M/A COM Components of Burlington, Massachusetts.

CORETECH represents a broad cross section of the research and development community: 65 universities, 30 companies, 14 associations, and 5 research institutes.

We want to commend this subcommittee for drawing attention to the important role tax policy plays in contributing to competitiveness. CORETECH strongly believes that tax incentives are a central part of any sound national research and development public policy. Our organization has targeted several R&D tax objectives as top legislative priorities. These are:

First, to remove disincentives to research and development such as Treasury Regulation 861;

Second, to adopt permanent, effective incentives for applied and basic research; and

Third, to expand and revitalize our research infrastructure.

With regard to the first objective, removing disincentives, I would like to report that we have made great progress toward resolution of our differences on the 861 issue. Dean Morton of Hewlett-Packard will address this topic in greater detail shortly; I would just like to note that CORETECH supports this tentative compromise that was reached last week. Of course, removing disincentives is not enough. We must also ensure that the most effective incentives are in place and that the research and development tax credit and the new basic tax credit form the core of our nation's efforts to increase private support of research.

Both of these credits work to correct—as we have heard this morning several times—the underinvestment that would occur if the market were left to its own devices. We strongly believe that both the credits should be strengthened and made permanent. Making the credits permanent would help remove the uncertainty that has plagued these provisions up to this time. This is a very serious issue in long-range research planning. Therefore, CORETECH strongly supports S. 58, which would restore the credits to the 25 percent rate and importantly make them permanent.

We also need to make the tax credit available to startup companies, as you mentioned. I believe that is very important—and to joint ventures. These enterprises are among our nation's greatest resources in the global technology race, and these R&D incentives will help them grow and interface.

The third tax policy objective is to expand and revitalize the United States research infrastructure. There are two tax-related issues here. First, we would change the equipment donation provision to cover donations of scientific equipment for both scientific education and research and training purposes. It is a very complex thing to administer at the present time. Second, we would make capital expenditures on research facilities exempt from the $150 million cap on tax-free bond financing by private universities.

This is an unfair situation between public and private universities. These two issues will be addressed this morning by Chancellor Hans Mark of the University of Texas.

The proposals we have discussed today by no means constitute a complete public R&D policy. However, CORETECH is in the process now of developing such an agenda. Before the creation of COR-

ETECH, there was no broad-based constituency supporting these policies. Now that we are organized, we hope to work hand in hand with you in Congress to forge a sound research and development policy, and I see you were charged this morning to work on that.

Let me just change the script here a little bit. I really learned something this morning, listening to these scholars and listening to these learned men talk on research and development. I am a research person; so, let me just digress here, and I will just make my last comment.

Back in 1981–1982 in our company, we were debating how much we should invest in a new material called Gallium Arsenide. Now, I am not going to give you a lecture on what it is. Needless to say, it is a semiconductor that competes and in some way is better than silicon. It is also, as I have read in the press, the material of choice for Japan's fifth generation computer. Now, this is an area where the Japanese are clearly ahead of us. And we saw great risks in competing; but at that time, we were debating our R&D level, and I was a part of that debate. We had just become aware of the R&D credit. Really, there was an educational process that we had to go through to even know what the credit was.

So, I think we did what the intent of the credit was. We became brave. We became much more expansive in our thinking and, in fact, we built a $25 million building, the largest gallium arsenide facility at that time and I believe at this time in the United States. We hired additional personnel, and we purchased $18 million worth of new equipment.

Let me make it clear. We would have invested in gallium arsenide—credit or no credit. But believe me, there is no way we would have been as aggressive. We wouldn't have taken as much risk. And that is something that I think may have been missed this morning.

Today, let me report that we are the largest producer in the United States of this gallium arsenide material—still small compared to Japan. I think the R&D credit helped us in ways that may not have been explained this morning.

First, sure, as a businessman, we looked at the incremental value of the credit, and we saw the credit in place, so we could be more risky. It is a financial issue, an economic issue. But second, and more importantly, the passage of that credit sent a positive signal to my colleagues, to my company and its management. It was important to us that the Government was recognizing the risk inherent in R&D and, in a subtle way, that changed our outlook.

At any rate, the battle still goes on. We are continuing to invest. The credit is still very important to us.

But let me just end by saying that, as a soldier in the field, and not as a scholar, ask me the question: Has the credit worked? And the answer is: Absolutely yes.

Senator BAUCUS. Thank you very much, Dr. Saloom. Dr. Mark is the Chancellor of the University of Texas. We are honored to have you here, sir. Please proceed.

[The prepared written statement of Dr. Saloom follows:]

Testimony of Dr. Joseph A. Saloom,
Senior Vice President, M/A COM Components, Inc.,
On Behalf of the Council on Research and Technology,
Before the Subcommittee on Taxation and Debt Management
Of the Committee on Finance of the United States Senate

April 3, 1987

Mr. Chairman and members of the Subcommittee:

Good morning. My name is Joseph A. Saloom. It is a pleasure to appear before you today on behalf of the Council on Research and Technology, or CORETECH. CORETECH is composed of 65 universities, 30 companies, 14 trade associations and 5 research institutes. I serve as Chairman of CORETECH, and as Senior Vice President of M/A COM Components, Inc. of Burlington, Massachusetts.

CORETECH was formed in early 1987 to address a wide range of issues affecting both applied and basic research. Members of CORETECH represent a broad cross section of the R&D community and are united by a common recognition that a strong research and development effort is vital to the economic future of the country.

We would like to commend this Subcommittee for drawing attention to the important role tax policy plays in contributing to R&D competitiveness. We believe that the United States can meet the challenge of international competition with the help of sound, stable public policy in the R&D field.

COPETECH believes strongly that tax incentives must be a central part of any sound national R&D public policy agenda. The organization has targeted several R&D tax objectives as top legislative priorities.

- removing R&D disincentives such as Treasury regulation section 861-8;
- adopting permanent, effective incentives for applied and basic research; and
- supplementing these across-the-board incentives with others designed to expand and revitalize the U.S. research infrastructure.

I would like to spend a few minutes discussing each of these proposals in greater detail. First, however, I would like to say a few words about the critical role R&D plays in keeping American companies competitive.

THE CENTRAL ROLE OF R&D IN TODAY'S GLOBAL ECONOMY

R&D is the driving force behind innovation, and innovation, according to Edward Dennison of the Brookings Institution, was responsible for 64 percent of the gains in U.S. labor productivity between 1929 and 1982. This increased productivity has made possible our high standard of living, and is the foundation of American economic competitiveness.

As the pace of technological progress has increased, the importance of R&D to the economy has also increased. Research intensive companies have established themselves as the most promising and dynamic segment of our economy. Our hopes of controlling our staggering trade deficit of more than $140 billion last year therefore rest disproportionately on research intensive companies. The importance of a strong R&D effort in helping to reduce the trade deficit is illustrated by the fact that, despite fierce competition in recent years, high tech goods accounted for 42 percent of exports of manufactured products in 1985, up from 35 percent in 1970.

R&D is important to all industries, not just the high tech sector. All companies are, or should be, striving to improve design and manufacturing processes and to create new products. Moreover, there is a significant spillover effect as new discoveries in one industry are adapted to countless uses throughout the economy.

Because the benefits of innovation are widely distributed throughout the economy, it is impossible for innovators to capture fully the value of the benefits they provide to society. This point was illustrated in a study by Professor Edwin Mansfield of the University of Pennsylvania which indicated that the rate of return to society from private R&D spending is approximately twice the rate of return to the private performers of R&D. This imbalance between public and private returns leads to chronic, structural underinvestment in R&D by the private sector. Most economists agree that this underinvestment by the private sector creates a role for government to provide incentives to stimulate a higher level of R&D investment. R&D incentives are therefore one way in which tax policy may be used to promote higher productivity, rising living standards, lower trade deficits and increased economic competitiveness.

STATUS OF COMPROMISE NEGOTIATIONS REGARDING SECTION 1.861-8

The controversy over Treasury regulation section 1.861-8 is an old issue with which many of you are already familiar. The regulation requires U.S. companies with foreign operations to allocate a percentage of their domestic R&D expenses to income earned abroad. It has been suspended repeatedly by Congress since 1981, but is now scheduled to take full effect on August 1 of this year.

The net effect of Section 861 is to deny companies full tax benefits for a portion of their domestic R&D expenses. To our knowledge, no other nation has adopted a similar rule. In fact, as Martin Baily has noted, many of our competitors offer generous incentives for R&D. Therefore, whatever the intent of the regulation may have been, its effect would be to put research intensive American companies at a disadvantage in the international marketplace.

I am pleased to report that we have made significant progress toward a permanent resolution of the section 861 controversy. We continue to believe that the regulation should be removed in its entirety; however, like many members of Congress, we understand that revenue constraints may dictate a less than ideal resolution of this issue. We therefore support a compromise agreement reached last week by interested members of Congress and the Administration. The agreement is tentative, and has not been endorsed by the Chairmen of the Finance and Ways and Means committees. We believe the compromise strikes an appropriate balance between the urgent need to maintain and expand our R&D infrastructure and real revenue constraints. We are therefore hopeful that this issue will soon be laid to rest. Dean Morton of Hewlett-Packard will address this topic in greater detail. I would just note that CORETECH believes it is critical that we have a permanent solution to the problem so that R&D policy in this area is stable and can be factored into long range R&D planning.

THE NEED TO STRENGTHEN CURRENT R&D INCENTIVES AND MAKE THEM PERMANENT

Of course it is not enough for us to remove R&D disincentives. We must also ensure that the most effective incentives are put into place. The Research and Development Tax Credit and the new Basic Research Tax Credit form the core of our nation's effort to stimulate private support of research. Both of these tax credits work to correct the underinvestment that would occur if the market were left to its own devices. CORETECH strongly supports strengthening and making permanent both of these credits.

The Need to Strengthen the R&D Credit and Make it Permanent

The R&D credit currently allows a company to claim a 20 percent credit for each dollar increase in R&D over the company's average spending on eligible R&D for the previous three years. This incremental feature of the credit is noteworthy because it only rewards additional R&D, therefore providing an incentive for companies to increase their R&D commitment.

The most recent Batelle forecast predicts that industry funding of R&D in 1987 will be more than double that of 1980. We believe that the R&D Tax Credit played an important role in this phenomenal growth in private support of R&D.

The first evidence of the effectiveness of the credit was provided in a 1984 study by Brookings Institution economists Martin Baily and Robert Lawrence, which indicated that the credit would more than pay for itself through gains to the GNP generated by innovation and increased productivity. Using standard economic assumptions (and a 25 percent rate for the credit), they estimated that a permanent credit could boost GNP by as much as $17 billion by 1991.

As you are aware from the testimony of Dr. Baily earlier this morning, Drs. Baily and Lawrence have recently conducted additional research that provides further evidence that the credit is working. Their data shows that increased R&D spending attributable to the R&D credit occurred at an average rate of about 7 percent between 1982 and 1985, which means that the credit generated about two dollars of R&D for each dollar of lost revenue.

The effectiveness of the R&D credit is all the more impressive in light of its erratic legislative history. It was first adopted at the original 25 percent incremental rate on a five year trial basis in 1981. Despite solid evidence that the credit was working, it was allowed to lapse for six months in 1986 while the tax reform debate raged on Capitol Hill. It was then extended at a reduced 20 percent incremental rate under the Tax Reform Act. Again, however, the credit was approved on a temporary rather than a permanent basis, this time through 1988. While it is understandable that Congress would want to adopt the credit on a trial basis initially, there is a cost in doing so. Corporate R&D funding involves long-term cost-benefit calculations regarding multi-year projects. R&D planners have thus far been unable to rely upon the continued existence of the credit, and this has surely been reflected in their decision-making.

Despite the uncertainty that has surrounded the R&D credit, it is the most effective stimulus for industrial R&D in our public policy arsenal. CORETECH strongly supports several changes to make the credit even more effective:

1. The credit should be made permanent at its original 25 percent incremental rate. Making the credit permanent will help remove the uncertainty surrounding the credit; restoring the 25 percent rate establishes a more appropriate level of incentive.

2. The credit should be made available to start-up companies and corporate joint ventures. The present law clearly discriminates against such enterprises, which are among our nation's greatest resources in the struggle for technological innovation. I understand that Ron Pherigo is here today on behalf of the American Electronics Association, and will be discussing this issue in greater detail.

As many of you know, a number of issues have been raised regarding the structure of the credit, including the three-year rolling base period upon which each firm's R&D tax credit is calculated. The evidence suggests that the structure already in place was effective at its former 25 percent rate. Nevertheless, we are open to discussions of alternative ways of structuring the credit to increase its incentive value.

The Need to Strengthen and Make Permanent the Basic Research Tax Credit

The Basic Research Tax Credit adopted last year under the Tax Reform Act provides a flat credit for companies sponsoring basic research at universities and nonprofit research institutions beyond a threshold amount. This credit was adopted not only to stimulate vital basic research activity, but also to foster greater contact and cooperation between the corporate and university research communities.

CORETECH strongly supports the Basic Research Tax Credit with two modifications. First, we believe it should be permanently extended to avoid the uncertainty that has surrounded the R&D Tax Credit; second, we favor strengthening the credit to a 25 percent rate. Both of these objectives are accomplished by S. 58. I understand that Dr. Hans Mark, Chancellor of the University of Texas, is here to address these issues in greater detail.

STRENGTHENING THE RESEARCH INFRASTRUCTURE

The quality of U.S. research depends upon the people, facilities, and equipment that constitute the research infrastructure. The third tax policy objective, therefore, -- after removing disincentives and strengthening major across-the-board incentives -- is to expand and revitalize this nation's research infrastructure.

Capital expenditures for research facilities, equipment and scientific and technical education have been postponed again and again in recent years as short-term needs have claimed a greater share of scarce resources. The higher education community recognizes that increased investments in the R&D infrastructure is now long overdue, and has targeted increased funding for modernizing outdated research facilities and for building new ones as a top priority.

CORETECH is developing several non-tax proposals in this area. However, there are two tax-related proposals that should be seriously considered. These are:

- a strengthening and refinement of the equipment donation provision;
- creation of a separate research facility category that would not be subject to the $150 million cap on tax exempt bond financing by private universities and other nonprofit institutions;

Strengthening the Equipment Donation Provision

Present law provides an enhanced deduction for donations of inventoried scientific equipment and apparatus that is donated to universities for use in research or research training in the physical and biological sciences. The provision permits most taxpayers to obtain a deduction of their costs plus one-half of the difference between their costs and the fair market value of inventoried property, but in no case more than twice their inventoried costs.

CORETECH supports a modest package of amendments to the equipment donations provision to maximize its effectiveness at minimum revenue cost.

These include:

- allowing donated equipment to be used for educational as well as research and training purposes in the physical and biological sciences. This change would eliminate an extremely difficult distinction in current law, making the provision easier to use and administer. The revenue cost for this change was estimated in 1985 to be less than $10 million annually.
- permitting eligibility of software. This would be accomplished by deleting the requirement that only software that is "tangible personal property" is eligible for the credit. This modification would be a significant improvement at virtually no revenue cost.
- additional improvements which Hill and Treasury staffs have advised us are technical in nature and have no revenue costs associated with them.

Easing Restrictions on Tax Exempt Bond Financing of Research Facilities by Private Institutions

The pressing need for new facilities stems from years of neglect. Unfortunately, the efforts of leading private universities to finance new facilities and to modernize outdated ones may be frustrated by a $150 million limit on the total amount of outstanding tax exempt bonds they may maintain. This limit potentially affects at least 25 leading private research universities such as Stanford, Harvard, the University of Chicago, Yale and MIT, but does not affect state supported universities. We believe the limit discriminates unnecessarily between public and private schools, and will have a negative effect on efforts to expand our research infrastructure.

Given the critical need in this area, CORETECH recommends that an exemption from the cap be provided for future capital expenditures on research facilities. This proposal meets a major need of private universities without exacting a large revenue cost. Current estimates place the cost figure at less than $20 million per year.

CONCLUSION

America's hopes for a prosperous future rest squarely upon its ability to retain its technological leadership. Technological leadership, in turn, depends in large measure on an increased commitment to R&D. The existing R&D tax credit and basic research tax credit are valuable tools in encouraging R&D. They should be strengthened and made a permanent part of our tax code.

We must also act to ensure that the R&D incentives we have struggled so long and hard to establish are not undermined by the disincentive effect of section 861.

Finally, we should strengthen our research infrastructure by adopting policies that encourage the building and maintenance of world-class research facilities, that increase corporate donations of state-of-the-art scientific equipment, and that encourage increased interaction between university and corporate labs.

The proposals we have discussed today by no means constitute a complete R&D public policy agenda. CORETECH plans to continue to develop public policy options to increase our national commitment to research and development. Before the creation of

CORETECH, there was no broad based constituency supporting these policies. Now that we are organized we hope to work hand in hand with you in Congress to forge a sound R&D policy.

In closing, I wish to commend this Subcommittee for its wisdom and foresight in drawing attention to an area of public policy that has received too little attention in recent years but is a critical element of our national effort to maintain our position in international competition.

On behalf of my company and CORETECH, I urge you to act swiftly to ensure our continued technological and scientific excellence. Thank you.

STATEMENT OF DR. HANS MARK, CHANCELLOR, UNIVERSITY OF TEXAS SYSTEM, AUSTIN, TX

Dr. MARK. Thank you, Mr. Chairman. You have already identified me, so I don't need to go through that part of the testimony; and I also have submitted a statement for the record, which is available to you and the other members of the committee. I am here to talk about the relationship between industrial and university-based research and to urge the Congress to extend and continue the incentive basic research tax credit for industry to fund work done at universities.

It is interesting, Mr. Chairman, that the relationship between industry and the universities is an old one, but it is worthwhile to remind people that even though it is old, it has been valuable in the past. I went to the drugstore this morning and bought a bottle of aspirin—here it is; it is Bayer aspirin—this is the world's best selling pain killer.

Aspirin is actually acetylsalicylic acid; that is the technical name for it. Acetylsalicylic acid was first synthesized in a chemistry laboratory at a publicly supported university in Germany. I xeroxed out the paper yesterday. This was published in the annals of Chemistry and Pharmacology Volume 115 in 1860; and here it is, the paper on acetysalicylic acid and its derivatives. This was done as purely university research. A few years later, somebody who was working for a textile firm called Friedrich Bayer and Company, which at that time was in the dyestuff business, discovered that this acetylsalicylic acid was an analgesic, in other words, a pain killer. And he talked his management into developing that product in collaboration with these fellows at the university. In 1899, they put it on the market, and it has been on the market ever since.

It took so long, by the way, because there were side effects and there were problems. And even 100 years ago, people went through the same exercise that we go through today, before products are put on the market.

I tell this story only to illustrate that the relationship is an old one and that what we are talking about is nothing new; and we are simply continuing what has proven to be an exceeding successful way of applying new knowledge to making a better life for people and that this is something that has been going on for a long time.

Let me give you a more recent example. This one is very personal. This a book that my brother the late Prof. Peter Mark of Princeton University and a collaborator, of Prof. Murray Lampent wrote. It was published in 1970. It is called "Current Injection in Solids." Now, what came out of the knowledge in this book are these things that you have all seen, I am sure. This is an electronics circuitboard; these things work because of the research done. My brother was a professor at Princeton at the time—because of the research done that is described in this book: knowledge, here; economic benefits, here. There is an interesting thing about this circuitboard. This is made by Digital Equipment Corporation, which is an American company; and the components were made by several American companies. There is Texas Instruments here and Raytheon and a few others; but if you look carefully at these components, here was one that was made in Malaysia, and here is another one that was made in the Philippines, and here is a third one that was made in El Salvador. Oh yes, here is one made in Taiwan. Interesting.

We exported the technology overseas because, as knowledge diffuses, you can't keep this nor do you want to keep it. All the nations that I have mentioned, Mr. Chairman, are nations which are allies, which have economic problems and where stability is important. So, as a matter of foreign policy, it is not a bad thing to have components on this circuitboard made overseas. That is small comfort to the people who think they have been displaced in our workforce because these things are made overseas.

The way to fix that, Mr. Chairman, is to continue to stay ahead. Dr. Saloom mentioned gallium arsenide. These are silicon chips; gallium arsenide comes next. And more recently, we have—I think in our laboratories—even other materials that may even be better. I am speaking here of materials that become superconducting at relatively high temperatures and things of that kind. I don't worry about exporting some technology overseas if it is clear that we are at the cutting edge of new technology. I don't worry that Boeing and the Japanese make deals to build aluminum airplanes, provided that I know that titanium and composite airplanes are built in this country.

And that is where the R&D credit comes in. The R&D credit is important because it allows us to maintain and expand technical leadership that we have held in the past. I represent a university that has a relatively large fraction of industrially funded research. We have about $75 million out of $300 million annually. I know, just as Dr. Saloom does, in talking to the people who sponsor our research that the R&D credits that you are considering do in fact have a positive effect. Thank you very much, Mr. Chairman.

Senator BAUCUS. Thank you very much, Dr. Mark. That is very helpful. Next, we will hear from Mr. Dean Morton.

[The prepared written statement of Dr. Mark follows:]

STATEMENT BEFORE THE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT OF THE UNITED STATES SENATE COMMITTEE ON FINANCE.

Dr. Hans Mark, Chancellor
The University of Texas System
April 3, 1987

Mr. Chairman and members of the Subcommittee. My name is Hans Mark and I am the Chancellor of The University of Texas System.

I am pleased to be here and to have the opportunity to commend the members of this Committee and of the Congress for adopting the new Basic Research Tax Credit as part of the Tax Reform Act of 1986. This new tax credit will encourage our industries to work more closely with universities in the all important area of basic research. The value of such cooperation has been well understood for a long time. In spite of this, I believe it is both important and necessary to repeat the argument periodically so that people will have a clear understanding of the way in which the connection works and why it is good public policy to support strong industry/university ties.

Let me give you two examples:

Aspirin is by far the most prevalent pain killing drug on the market. It has been a successful product for almost ninety years since it was first introduced under the trade name "Aspirin" by Dr. Hermann Dreser in 1899. How did Aspirin come to be? Aspirin is actually acetylsalicylic acid. Salicylic acid and its derivatives were first synthesized by two German university chemists, H. Kolbe and E. Lautemann, working in the chemical laboratory at the University of Marburg in 1860. This work was part of the development of the then new science of organic chemistry. There were many university groups in Europe at that time busy synthesizing large numbers of new organic compounds and defining their chemical properties. The work was performed because their universities had the mission to perform basic research just as ours do today.

In hindsight, it is not surprising that some of these chemicals turned out to be very useful. In the case of acetylsalicylic acid, a chemist named Hoffman discovered around 1875 that the substance had pain killing properties. He happened to be working for a textile and dye-stuff concern, Friedrich Bayer and Company, but he was able to persuade his management to look at doing something new in the area of pharmaceuticals. Thus, after an extensive period of what we today call product development, Aspirin was born. Friedrich Bayer, the textile entrepreneur, is now remembered because every box of Aspirin that you buy carries his name.

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This story is a classic example of how fundamental knowledge is turned into a commercial product. What is important is that the value of the product is not contained in the cost of the elements carbon, hydrogen and oxygen of which acetylsalicylic acid is made. The value is in knowing how to put these elements together so that a pain killing drug results. The value, therefore, is in the knowledge of the structure of the compound and it is, of course, in developing this knowledge that universities excel.

My second example is an extremely personal one because it concerns my late brother, Professor Peter Mark, who until his death in 1979, was a Professor of Electrical Engineering at Princeton University. In 1970, he and his colleague, Professor Murray Lampert, published a book entitled "Current Injections in Solids." The book summarized the state of knowledge in this important field which had to do with how electric currents are injected into and carried by certain materials. Since 1970, this knowledge has been applied in the explosive growth of an electronics industry based on integrated circuitry made from silicon semiconductors. Just as in the case of Aspirin, the value of these products is not in the materials. Silicon is cheap and abundant. The value is there because we know how to structure the silicon so that it becomes a useful electronic component which can carry and control electric currents. Also, as in the case of Aspirin, much of the original basic knowledge on which the operation of the silicon chips depends came from universities.

These examples make the point very clearly and they do so in a successful historical context. I do not trust cost benefit analyses when it comes to measuring the value of research because it is impossible to tell where the research will lead. Another way of saying this is that cost benefit analysis works only when the benefits are predictable. In the case of research, they are clearly not. It is for this reason that the best way to justify basic research is to look at what has happened in the past, as I have just tried to do for you.

Research is not cheap. A corporation that is in the business of developing and applying advanced technology may spend as much as 20 to 30 percent of revenues on research and product development. Equipment is expensive and really good research and development people command high salaries. Research is expensive because often the expected results do not materialize -- there are just not that many aspirins in the world. The corporate research budget must be structured to anticipate failure in most research efforts. Thus, even corporations with large research budgets are likely to work on projects oriented toward commercial development and to draw on rather than to expand the existing knowledge base. The research tax credit provides an incentive for corporations to spend a portion of their research budgets on expanding the basic knowledge on which they ultimately depend for the creation of new products. This to me is the real value of the measure that you have passed and that I would like to urge you to extend.

Although research is expensive and is often a good fraction of a high technology corporation's budget, research is still a very small activity when viewed in terms of national spending. The United States has a gross national product of more than $4 trillion and a national budget of about $1 trillion. Spending on all research and development in the United States for the current fiscal year (1987) is estimated at approximately $80 billion or about 2% of the gross national product. Federal spending on research and development (including defense) is about $40 billion or about 4% of the federal budget. Furthermore, the fraction spent on basic research at universities is even smaller, about $7 billion in the current fiscal year or 0.2% of the gross national product. Even fairly large increases in our national research investments, therefore, would have only a minuscule effect on the federal budget.

Federal tax policies as they relate to basic research at universities are important in developing our knowledge base. Unfortunately, the relationship between industries and universities in this country has not always been as strong as I would like to see. Corporate support for university based research accounted for about eight percent of all research funds in 1960 and only four percent by 1980. Over the past several years, this downward trend has been reversed and corporate support of university research is now up to about ten percent of the total research money spent at universities. I am glad to report that for The University of Texas System, it is substantially higher. In Fiscal Year 1986, The University of Texas System expended $311 million for research, of which about $75 million or 24% came from industrial sources. Furthermore, we are very interested in expanding this source of support.

The new basic research tax credit should keep this trend going in a positive direction. The new credit went into effect on January 1st of this year and provided a 20% flat rate credit that can be claimed by companies for basic research conducted for them at universities. We believe that the new credit should encourage companies to seek out greater university involvement in their research activities. There is no doubt whatsoever in my mind, based on the historical examples I have given, that the expansion and development of new relationships will be mutually beneficial. By performing research for industry, universities reap the advantage of being able to attract the very best people for basic research projects that are conceived and developed in cooperation between university faculty members and industrial managers. For companies there is the promise of important new scientific and technological progress and furthermore, there is the prospect of introducing students to the latest research which they may encounter in subsequent careers as industry employees.

The success of the new Basic Research Tax Credit will depend on the extent to which it is used to better acquaint the American research community with the new credit and how it works. The Council on Research and Technology has prepared a booklet explaining the incentive. I respectfully ask permission to have the contents of this booklet inserted as part of the hearing record in the hope of more widely disseminating the information about this new policy.

The current law creates the Basic Research Tax Credit to be valid until December 31, 1988, two years after the credit went into effect. Because basic research is, by its very nature, a long term undertaking, multi-year commitments are necessary to bring projects to fruition. Therefore, I recommend that the Basic Research Tax Credit should be made permanent. Specifically, we support Senate Bill 58 introduced earlier this year by Senators Baucus and Danforth and co-sponsored by many members of the Finance Committee, which would make the Basic Research Tax Credit a permanent part of the tax code. The current two year time period allowed under the Tax Reform measure is simply too short to give this new credit a chance to be fully effective.

In addition, to the Basic Research Tax Credit, I would also like to discuss two other provisions in the Tax Reform Act of 1986 that relate directly to our ability to finance research support in universities. This support must include equipment and facilities as well as the direct salaries paid to people doing the research. The enhanced deductions granted to corporations for gifts of scientific equipment to universities have been extremely important. We have been able to upgrade research laboratories in many instances because of donations of advanced apparatus. I believe that a few changes with modest revenue cost would make the equipment donation incentive an even more effective provision.

Present law now makes a distinction between gifts of scientific equipment for research and research training and gifts of the same equipment for educational purposes. The former are eligible for enhanced deduction while the latter are not. I would suggest permitting the use of donated equipment for scientific education purposes should be made tax exempt as well. This change would make the provision in the law easier to administer and would help advance higher education at the same time.

I would also suggest clarifying the eligibility of software donations for the enhanced deduction. Currently, software is eligible only if it is considered tangible personal property, leaving eligibility unclear. A modification of that allows software to be eligible without regard to whether it is tangible property would have little or no revenue cost but it would make it much more attractive to corporations to make donations of computer systems with software.

The other major tax provision I wish to discuss has to do with financing of university research facilities. In recent years, the tax exempt securities market has become an important source of funds for building new laboratories. Last year under the Tax Reform Act, Congress imposed a $150 million limit on the tax exempt financing of private non-profit institutions. Although this provision does not affect public universities like the ones in The University of Texas System, it will affect many of our nation's foremost research universities, and for that reason we should all be concerned. I hope that Congress will create a special category of research facilities and see to it that their construction can be financed under favorable tax exempt terms. Just as in the case of basic research tax credit, there is no doubt that such a provision is, indeed, good public policy.

Let me conclude my statement by making another extremely important point. The subject of our position in the international market place has received much attention in recent years. There is no doubt that our trade deficits are too high. Likewise, there is no doubt that erecting barriers to trade is ultimately self-defeating. Most major industries are international today and it is true that corporations balance domestic and foreign operations to their (and, hopefully, their customer's) advantage. This has been especially true in the electronics industry. American firms have manufacturing operations all over the world and in this sense, jobs have been exported overseas. One can argue that this export of jobs is, to some extent, to our national advantage. We have created employment in nations such as El Salvador, the Philippines and Malaysia and have therefore, enhanced the economic and political stability of those lands. While this argument may be true, it is of small comfort to those who feel they have been displaced in the domestic work force.

Is there anything that can be done to deal with this situation? Once again, I believe that a really vigorous national basic research program would help. If the United States can maintain the position of being the nation in which most major new technological innovations are first introduced, then we are in a good position to capture the initial employment that results from the innovation. I am less concerned when I see an American aircraft company manufacture aluminum aircraft in collaboration with an overseas firm if I also know that the same company is manufacturing airplanes based on the newer titanium structures technology in this country.

What all this illustrates is the importance of staying ahead in the creation of new knowledge. There is no question that our great research universities are still the best in the world. By supporting them strongly and by providing appropriate incentives for industry to work with them, we are playing to our strengths. In my experience, that has always been a good strategy. It is for this reason, Mr. Chairman, that I strongly support the measures we are considering at this hearing.

Thank you, Mr. Chairman, and members of the Subcommittee. I will be pleased to answer any questions.

STATEMENT OF DEAN MORTON, CHIEF OPERATING OFFICER, HEWLETT-PACKARD, PALO ALTO, CA

Mr. MORTON. Thank you. We appreciate the opportunity this morning to present our views. I am the Chief Operating Officer of the Hewlett-Packard Company, and I am here to speak in support of the 861 compromise, a subject about we have heard a fair amount already this morning; but I do want to put it in specific terms relative to examples that I have to see for myself.

H–P makes a lot of electronic products and systems for measurement and computation. During our last fiscal year, we had sales of over $7 billion, about one-half of which were outside the United States. Two-thirds of our 82,000 employees, however, work in the United States. I think it is relevant that, of the worldwide R&D expenditures for our company of $824 billion, 90 percent of that total R&D expenditure was in the United States. We exported from the United States products that had a value of $1.4 billion. In fact, H–P is about the thirteenth largest exporter in the United States, even though we are only 58th on the Fortune List of 500 companies in size.

Because we have substantial operations outside the United States but perform virtually all of our R&D within the United States, the Tax Code rules for allocating R&D expenses to foreign income are of major importance to us.

The simple fact is that, for Hewlett-Packard, like most R&D intensive companies, allocations of R&D expenses in the United States to foreign source income are the equivalent of denying a U.S. tax deduction in the United States for those expenses. This is really a very important issue for my company and for the United States, I believe. We must recognize that worldwide competition now extends to R&D activities and facilities.

Ten years ago, U.S. companies almost automatically located important R&D facilities in the United States for nontax reasons; but more recently, the opportunities for locating facilities abroad have expanded substantially.

Decisions on locating R&D facilities are now subject to much more careful examination and review. In today's world, a decision to locate R&D activities in a particular country is influenced by many factors. A critical concern is the availability of trained scientists, engineers, and other professionals at a competitive cost. Proximity to major research universities, proximity to manufacturing facilities, tax treatment of R&D activities, and government grants to encourage R&D are also of major importance.

For example in 1983, we made a decision to locate a branch of our central Hewlett-Packard corporate research laboratories in Bristol, England. There were several factors motivating this move. The universities in the United Kingdom were training substantial numbers of graduates in computer science, and salaries in the U.K. are generally lower than in the United States.

In addition, the government provided attractive incentives through cash grants to develop this particular research facility. In a number of other countries, we have given our manufacturing divisions the responsibility for developing additional products, that is, the manufacturing divisions of those organizations in countries outside the United States.

These foreign facilities thus have the opportunity to develop products and to assume the worldwide responsibility for marketing and manufacturing these products.

The key to understanding H–P's organization is that manufacturing activity in many ways correlates with R&D activities. When a product is developed in a particular location, it is typically much easier to manufacture at that same facility or nearby. This is an important reason why it is critical for the U.S. tax laws to provide incentives and not disincentives to conducting R&D in the United States.

Much more than the R&D activity is at stake. The result of conducting R&D abroad is typically that the manufacturer of those products is conducted abroad as well.

Hewlett-Packard's experience in our own R&D siting decisions and our concerns about trends in the U.S. economy generally lead us to conclude that the best policy for the United States would be to enact a permanent ban on any allocation of R&D expenditures to foreign source income.

However, we recognize that such a solution would cost substantial revenues. We also understand that the budget deficit itself can be a significant contributor to our problems in international trade and competitiveness. For this reason, we endorse the compromise proposal developed by the Administration and the chief Congressional sponsors of Section 861 moratorium legislation and discussed here today by Secretary Mentz.

We appreciate very much the crucial efforts of Senator Baucus and Senator Wallop of this committee in working toward this compromise. Without them, this surely would not have happened. While this compromise is not ideal, if enacted on a permanent basis, we believe it is sufficient to eliminate Section 861 allocations as a disincentive to U.S. based research. If the compromise solution plus a permanent extension of the R&D tax credit could be enacted, we would finally have in the United States a lasting set of tax provisions which make a strong statement to U.S. companies to expand their R&D activities and to make sure those activities take place in the United States. Thank you.

Senator Baucus. Thank you, Mr. Morton. Mr. Pherigo?

[The prepared written statement of Mr. Morton follows:]

BEFORE THE SUBCOMMITTEE
ON TAXATION AND DEBT MANAGEMENT
OF THE SENATE FINANCE COMMITTEE

WRITTEN STATEMENT OF

DEAN O. MORTON

CHIEF OPERATING OFFICER

HEWLETT-PACKARD COMPANY

April 3, 1987

My name is Dean O. Morton. I am an Executive Vice President and the Chief Operating Officer of the Hewlett-Packard Company of Palo Alto, California.

Hewlett-Packard Company is a major designer and manufacturer of electronic products and systems for measurement and computation. During its last fiscal year, Hewlett-Packard and its subsidiaries had sales of over $7 billion, 46% of which were to customers outside of the United States. HP has over 82,000 employees worldwide, of whom about 53,000 work in the United States. Worldwide capital expenditures last year were $499 million. HP spent almost 12% of revenue, or $824 million, on R&D last year, 90% of which was spent in the United States. The Wall Street Journal (Nov. 10, 1986) recently ranked HP as the eleventh largest U.S. corporate R&D spender. HP exported from the United States products with a value exceeding $1.4 billion.

Fortune magazine and Business Week rank HP among the top ten or fifteen exporters, even though HP is only ranked 58th in overall size on the "Fortune 500" list.

Because Hewlett-Packard has major operations outside the United States, but performs virtually all of its R&D within the United States, the tax code rules for allocating R&D expenses to foreign income are of major importance. The simple fact is that for Hewlett-Packard, like most major R&D-intensive companies, allocations of R&D expenses in the United States to foreign source income are the equivalent of denying a U.S. tax deduction in the United States for those expenses.

Admittedly, taxpayers are not directly disallowed any deduction, but the impact is the same. For each dollar of R&D deduction that is allocated to foreign sources, foreign tax credits are disallowed in an amount equal to the U.S. tax rate times the allocated expenses. For example, if a company spends $1 million on R&D which is allocated to foreign sources, it does receive a deduction for that $1 million, potentially generating a tax reduction of $340,000 (at a 34 percent corporate tax rate). But at the same time, the allocation of that $1 million to foreign source income will reduce by $340,000 the maximum foreign tax credits which the taxpayer can earn. The foreign tax credit reduction completely offsets the value of the tax deduction, and the result is mathematically the same as if no deduction were allowed in the first place.

It is important to understand that only U.S. taxpayers which pay high levels of foreign taxes are affected by this provision. It is this group of taxpayers, which include most major multinationals making substantial investments in R&D, for which the deduction disallowance effect occurs through the reduction in allowable foreign tax credits. Other taxpayers, for example research-intensive companies which pay low levels of foreign tax, are permitted the deduction without any offsetting impact to their allowable foreign tax credits. These companies are generally smaller and have less extensive international operations. Thus, the section 861 R&D provisions act as a disincentive for those U.S. companies performing research in the United States which also have substantial highly taxed operations outside the United States.

The fact that the section 861 regulations as in effect before 1981 have an adverse impact on U.S. companies paying substantial levels of foreign taxes is not controversial; a 1980 Treasury study agrees with this result:

> By denying U.S. corporations a deduction for domestic R&D expenses against domestic income and by assigning some portion to foreign source income, where it often is not allowed as a deduction for part of R&D expenses, the apportionment can effectively deny any tax deduction for a part of R&D expenses.
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> ["The Tax Treatment of Research and Development (R&D) Expenditures of

Multinational Corporations: The Impact of Regulation 1.861-8." U. S. Treasury Department, Office of Tax Analysis, December, 1980.

Moreover, for those U.S. companies which lose the equivalent of a tax deduction in the United States, no offsetting benefits are earned in foreign countries. Most of these companies, including Hewlett-Packard, operate in foreign countries almost exclusively through foreign subsidiaries. These subsidiaries in virtually all cases do not perform R&D in the United States. Only the U.S. parent company or another U.S. affiliated company performs U.S. research. The foreign governments have no basis for subjecting the U.S. companies performing the research to their taxing jurisdiction. Therefore, they cannot allow any deduction for the research expenses of these companies against their tax even if the expenses are allocated under U.S. rules to foreign source income. Thus, companies subject to a foreign tax credit disallowance because of a section 861 allocation of research expenses to foreign source income obtain no tax benefit from that expenditure any where in the world.

From a technical tax point of view, I am told there may be a rationale for allocating some level of R&D expenses to foreign source income, even though the Treasury regulations do so in a way that imposes a large penalty on major R&D-intensive, multinational companies. However, it is important that this issue not be decided merely with a view to technical tax policy concerns. The United States increasingly recognizes that its people and their employers are caught up in a worldwide competition for markets, jobs, and to increase our standard of living. In the context of this competition, it is important that the United States Government not erect roadblocks against U.S. companies competing effectively -- particularly in areas like research and development activities where the United States has traditionally enjoyed dominance, but is now facing substantial new competition.

A decade or more ago HP, like most U.S. companies, almost automatically located important R&D facilities in the United States for non-tax reasons. But more recently, the opportunities for locating facilities abroad have changed substantially. Decisions on locating R&D facilities are now subject to much closer scrutiny. In this kind of environment tax considerations, including major impediments like the section 861 regulations, can play an important role in company decisions.

Besides tax considerations, critical factors in the decision to locate R&D activities in a particular country include the availability of well-trained scientists, engineers, and other professionals at a competitive cost. Proximity to major research universities, proximity to manufacturing facilities, tax treatment of R&D activities, and government grants to encourage R&D are also of major importance.

In 1980, an internal study conducted by our company concluded that it would be economically advantageous on an after-tax basis to increase the portion of our worldwide R&D effort conducted outside the United States. Since that time both the moratorium on R&D allocations under section 861-8 and the R&D tax credit have been enacted, and we have increased our domestic R&D expense from $327M in 1981 to $739M in 1986. If these two legislative provisions which favor the conduct of R&D in the United States are not extended, the analysis might again favor the location of R&D offshore. In fact, this result could be more compelling now than in 1981 because of favorable R&D incentives enacted since 1981 in other countries and foreign tax rule changes in the United States.

Let me briefly describe HP's overall approach to research and development and then relate that of our activities in a few specific countries. Hewlett-Packard is organized into major business sectors, comprised of product groups which typically contain a number of business units we call divisions. The division, or factory, level R&D focuses on product development. This development phase involves turning technologies into products which can be sold to customers. At the group or sector level, the R&D activity is designed to ensure a consistent approach to solutions of technical problems that would affect many divisions, and to avoid duplication of effort by developing one, rather than several variations of a particular product, such as a personal computer. In addition, HP's central R&D group, HP Labs, focuses on more fundamental research into technologies that might enable a division R&D lab to develop a product. In broad outline, this is the organizational structure through which HP conducts its worldwide R&D.

The activities of HP Labs traditionally have been conducted in the vicinity of our corporate headquarters in Palo Alto. This focus in Palo Alto occurs for a variety of reasons which include the synergism of conducting most basic research in one location, and our proximity to such major research universities as Stanford and the University of California at Berkeley. However, in 1983 a decision was made to locate a branch of HP Labs in Bristol, England. Several factors motivated this move, including that universities in the United Kingdom were producing substantial numbers of well-trained graduates in computer science. Salaries in the UK are generally lower than in the U.S., and in 1983 with a very strong dollar, this effect was particularly strong. In addition, the government provided attractive incentives through cash grants to develop this research facility.

In a number of other countries where HP has established manufacturing operations, we have given our manufacturing divisions the responsibility for developing new products. These foreign factories thus have the opportunity to develop products and usually to assume the worldwide responsibility for marketing and manufacturing these products. In fact, in a number of cases, the technology to manufacture a product is actually licensed by our foreign affiliates to HP in the United States. In this context, it is feasible for HP to transfer significant R&D activities outside the United States, if it became commercially necessary for us to do so.

One key point to understand in this regard is that manufacturing activity seems to follow R&D. When a product is developed in a particular location, it is typically much easier to manufacture at that same facility or nearby, than to transfer manufacturing responsibility for the product to another country. This is why it is critical for the U.S. tax laws to provide incentives and not to provide disincentives to conducting R&D in the United States. Much more than the R&D activity is at stake. The result of conducting R&D offshore is typically that the manufacturing of any products developed is conducted offshore as well.

Let me share with you a recent example of our sensitivity to negative tax factors with regard to the location of R&D activity. In 1983, our French subsidiary underwent an audit of its French income taxes. One item in issue was whether R&D expenses for developing computer software should have been capitalized or expensed.* Although we thought expensing was the proper treatment, the law was not clear. At the time we were considering a plan to locate a number of software engineers at our French factory. Doing so would have been sound business judgment on our part because the additional R&D effort would have provided a good match with other R&D and manufacturing already taking place there. If the expenses related to this activity were capitalized, however, the additional tax cost would have been excessive and probably would have made the arrangement economically unviable. Fortunately, the French government passed legislation in 1984 which clarified the rules to ensure that software development expenses were deductible R&D costs, and even applied this rule retroactively. This situation illustrates that tax disincentives for conducting R&D in a particular country could have forced us to reduce the amount of R&D activity conducted there.

OTHER COUNTRY INCENTIVES FOR R&D

Without trying to present to the Committee an encyclopedic recitation of the various rules for the tax treatment of R&D in the many countries around the world, I would like to share with the Committee a few general observations about R&D incentives in other countries. Many countries are actively attempting to attract R&D activities. For example, in the case of France which I referred to earlier, the French tax authorities were asserting a position which would have clearly increased revenues. However, those in the government concerned with trade and economic policy recognized that position as shortsighted, since R&D activity would be discouraged. In particular, investments in software R&D conducted in France would clearly be less attractive than R&D conducted in many other countries, particularly their neighbors in the Common Market. The rather quick and thorough clarification of French law in a manner to encourage R&D reflected a recognition of the importance of R&D to the French economy.

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* France, like all other countries in which HP operates generally allows the expensing of R&D costs. However, in 1983 the eligibility of certain software-related development costs for this treatment was uncertain.

For many years Singapore has offered tax incentives to attract manufacturing activity, which has dramatically increased the standard of living in Singapore. The government there has recently begun to look to such activities as software and product R&D as the basis for the most favorable tax regime.

With regard to the only HP Labs facility outside the United States, in Bristol, England, a grant from the UK government was a critical element in making this a sound and viable venture on our part.

Countries such as Germany, Japan, Australia, and others also recognize the benefits of R&D to their economies and encourage it through favorable tax and other policies.

Furthermore, no country other than the United States has a rule similar to the 861-8 regulations which allocates domestic R&D expenses to foreign source income.

Management at HP is strongly oriented toward placing most of its R&D activity in the United States. On the other hand, we cannot ignore economic realities in an effort to minimize the worldwide after-tax cost of an activity such as R&D, which consumes so much of HP's resources. Thus, we must become increasingly careful to weigh the advantages and disadvantages involved in alternative locations for R&D activity. We hope that the 861-8 R&D allocation rules will not become a major disincentive to conducting R&D in the United States.

SUPPORT FOR PROPOSED COMPROMISE

Hewlett-Packard's experience in its own R&D siting decisions and its concerns about trends in the U.S. economy generally lead us to conclude that the best policy for the United States would be to enact a permanent ban on any allocation of R&D expenditures to foreign source income. However, we recognize that such a solution substantially affects estimates of revenue costs. We also understand that the budget deficit itself can be a significant contributor to our problems in international trade and competitiveness. Thus, we believe a compromise solution, which recognizes a basic policy of allocating R&D expenditures to U.S. rather than foreign source income, but cuts back on estimates of revenue costs by allowing a reasonably modest allocation of R&D expenditures to foreign sources, is acceptable.

For this reason, we endorse the compromise proposal developed by the Administration and the chief Congressional sponsors of section 861 moratorium legislation and discussed today by Assistant Treasury Secretary Mentz. We applaud the hard work of Senators Baucus and Wallop of this Committee in working towards this compromise. We also appreciate the open-mindedness of the Treasury Department to look beyond narrow tax policy concerns and see the interrelationship of the 861 allocation issue and concerns regarding U.S. industries' competitiveness in world markets.

While this compromise solution is not ideal, it is sufficient to avoid any significant disincentive impact. Most important, when enacted on a permanent basis, it will provide needed stability to U.S. R&D tax policy. If the compromise solution, plus a permanent extension of the R&D tax credit could be enacted, we would finally have in the United States a lasting set of tax provisions which make a strong statement to U.S. companies to expand their R&D activities and to make sure those activities take place in the United States. That will be an important step in developing our competitiveness.

Thank you.

STATEMENT OF RON PHERIGO, PRESIDENT, APPLIED COMPUTING TECHNOLOGY, RESTON, VA, ON BEHALF OF THE AMERICAN ELECTRONICS ASSOCIATION

Mr. PHERIGO. Good morning, sir. You have my full statement for the record; and for brevity, I would just like to provide some highlights of my own experience.

Senator BAUCUS. Your statement will be included.

Mr. PHERIGO. I am Ron Pherigo. I am President of Applied Computing Technology in Reston, Virginia. Applied Computing Technology is a small company—a small business. We are currently in the startup stage. This fact is critical to the reason why we are here today to testify on behalf of the American Electronics Association.

A few facts about Applied Computing will set the context for my statement. We were founded in late 1986. We are a computer engineering firm. We are initially making a benchmarking product for the large mainframe computer environment. At the moment, there is no such product on the market, and a high percentage of our expenditures, therefore, are geared to product development; and that is R&D expense.

This market niche that we are aiming for is targetted—and we have every indication of that—or will soon be targetted by others. To win the race to market and, (equally vital to our success) to remain ahead of the pack, I must not only expend considerable capital now on talent and product development, but I also must be far down in the road in developing the technology for my second-generation product even before I may ship my first product.

Our initial financing so far has been internally generated by myself and the other founders. Some time soon, our company will have to seek external financing from one or a combination of sources, such as venture capitalists, banks, or other financial institutions who do asset financing.

My personal preference is to seek a source and to find a source which will enable me to keep control of my company. The modifications to the R&D tax credit which I will propose on behalf of AEA later in my statement will be very important in helping me secure the additional financing I will require if ACT is to become a viable enterprise.

The American Electronics Association is the nation's largest high technology trade association and consists of over 3,000 companies across America. A significant proportion of those member companies were once fledging startup companies like myself and, in some instances, as recently as ten years ago. Their successes have been legendary in this environment, and because of its history, AEA has a tradition for speaking for the entrepreneurial factor of the electronics industry.

Today's hearing is examining the impact of tax policy with respect to research and development on international competitiveness. The Federal Government has provided financial support for research and development activities through tax policy, spending programs, and procurement programs.

Major elements in tax policy are the incremental tax credit for research and development expenses, the tax credit for contributions toward basic research undertaken by universities and institutes, and the ability of companies to allocate R&D expenses incurred here in the United States between foreign and domestic income in advantageous ways.

AEA is a founding member of the Council on Research and Technology (CORETECH) and strongly endorses the statements presented to the subcommittee on behalf of CORETECH.

We now have some six years experience with the R&D tax credit. The credit has become a major component of tax policy in support of increased research and development. Some of the problems in the design of the credit's base have been mentioned in the testimony. Among these problems is the inability of startup companies to obtain the benefit of the credit for R&D expenditures.

AEA urges the committee to consider its proposal to make the R&D expenditures of startup companies eligible for the credit, and CORETECH in its statement here this morning has endorsed the AEA proposal. We believe, Mr. Chairman, that legislation such as that proposed in S. 58, the Research and Development Incentive Act, a bill which the chairman introduced with Senator Danforth, to make permanent and to increase the R&D tax credit will be greatly strengthened by thoughtful modifications to the credit along the lines proposed by AEA.

I know for certain that such changes will be very important and very helpful to start-up companies like mine.

I would like to thank the Senator for letting Treasury know of your specific interest in helping start-up companies and small companies; and I hope that we can work with you in that regard.

Senator BAUCUS. Thank you, Mr. Pherigo.

[The prepared written statement of Mr. Pherigo follows:]

Statement of
Ron Pherigo,, President of Applied Computing Technology
Reston, Virginia
on behalf of the
American Electronics Association
before the
Subcommittee on Taxation and Debt Management
of the
Committee on Finance
United States Senate
Washington, D.C.

April 3, 1987

Mr. Chairman, my name is Ron Pherigo, and I am President of Applied Computing Technology of Reston, Virginia. Applied Computing Technology is a small business in the start-up stage. This fact is critical to the reason why I am here today to testify on behalf of the American Electronics Association.

A few facts about Appplied Computing Technology will set the context for my statement. ACT was founded in late 1986 and is a computer engineering firm. It will make a benchmarking product for IBM mainframe computers. At the moment there is no such product on the market. A high percentage of the company's expenditures are related to product development, that is R&D expense.

The market niche that ACT is aiming for is or will soon be targeted by others. To win the race to market -- and equally vital to success -- to remain ahead of the pack, I must not only expend considerable capital and talent on product development, but I must also be far down the road in advancing the technology for my second-generation product even before I am shipping my first product.

ACT's initial financing, so far, has been internally generated from its founders. Sometime soon our company will have to seek external financing from one or a combination of sources such as venture capitalists, banks or other financial institutions. My personal preference is to seek a source which will enable me to keep control of my company. The modifications to the R&D tax credit which I will propose on behalf of AEA later in my statement, would be very important in helping me secure the additional financing I will require if ACT is to become a viable enterprise.

Mr. Chairman, I appreciate and I am honored testify before this subcommittee on behalf of AEA on improvements to tax policy with respect to research and development which will enhance the ability of the United States to compete successfully with other nations.

The American Electronics Association is the nation's largest high technology trade association consisting of 3,250 companies across America. AEA membership is representative of all segments of the industry, including computers and computer components, semiconductors, instruments, telecommunications, and software. Although three-fourths of AEA's members employ fewer than 250 people, AEA also represents two-thirds of all the large electronics companies in the U.S. with over 1,000 employees.

As a consequence, AEA brings to the table the views and attitudes of a very dynamic, innovative, hard-working and competitive group of companies deeply involved in high technology research and development.

A significant proportion of AEA member companies were once fledgling start-up companies, in some instances as recently as ten years ago. Their successes have been legendary. Because of this history, AEA has a tradition of speaking for the entrepreneuerial sector of the electronics industry.

THE ELECTRONICS INDUSTRY IS THE LARGEST MANUFACTURING EMPLOYER IN THE U.S.

Electronics is a vital segment of the American Economy and a toolmaker that enables other industries to strengthen productivity and competitiveness. Between 1978 and 1984, the electronics industry created over a million new jobs in the U.S. Electronics now directly employs 2.5 million Americans and many more indirectly in related industries. The chart on the last page shows that the industry employs four times more people than either motor vehicles or aerospace and six times more than steel. We in the electronics industry are very proud of this contribution. We believe it reflects the traditional preeminence of our technological innovation as well as the strong competitive posture of our industry.

There is substantial evidence, however, that this strong competitive position is eroding. The United States' world-wide trade in electronics products has fallen from a surplus of $7.4 billion in 1980 to a deficit of $13.1 billion in 1986. Employment in the industry has remained flat since 1984.

Today's hearing examines the impact of tax policy with respect to research and development on international competitiveness.

The Federal Government has provided financial support for research and development activities through tax policy, spending programs and procurement programs. Major elements in tax policy are the incremental tax credit for research and development expenses, the tax credit for contributions toward basic research undertaken by universities and institutes, and the ability of companies to allocate R&D expenses incurred here in the United States between foreign and domestic income in advantageous ways.

AEA is a founding member of the Council on Research and Technology (CORETECH) and strongly endorses the statements presented to the subcommittee on behalf of CORETECH.

As I stated earlier in my testimony, I will now address an aspect of the R&D tax credit that impacts the vital start-up sector of our industry. The proposal I will discuss has been developed by the AEA Tax Committee and is derived from numerous experiences of of start-up and small companies, like ACT, for whom the R&D tax credit, as presently structured is of little or no value.

R&D TAX CREDIT FOR START-UP COMPANIES

As stated earlier, a significant proportion of AEA's largest and most successful members were small start-up companies only a few years ago. The start-up stage of business is extremely risky and volatile. In high technology industries, start-ups literally are competing for survival in the spawning grounds of American industry.

Every year approximately 500 AEA member companies disappear due to acquisitions, mergers, failures and bankruptcies. Many of these companies are very small start-up companies fighting for survival. Some of the disappearances are a form of success -- an innovative technology is developed which attracts interested buyers and the company,, along with its technology, is sold. But often the acquisition takes place because the original owner of the business has no other alternative: he's out of capital; he's shipping product, but the after-tax earnings will be insufficient

to fund the new R&D necessary to keep the product's technology advancing ahead of the competition.
That's the critical situation I will be facing very soon, Mr. Chairman. I want very much to succeed.

In the electronics industry, as I have explained previously in describing my company, a start-up company not only has substantial research and development costs initially, but it must invest in additional research on the second generation of its products' technology even before the first generation is being shipped to customers and revenues have not yet started to flow into the company.

That's the point where the company can best use the lift of a tax credit to offset taxes on new income earned as product is being shipped and sold.

Unfortunately, just as the company starts to take-off with an innovative product the tax law puts on the brakes.

Under current law, the incremental research credit applies to qualifying research expenses incurred in connection with an existing trade or business. If a start-up company has not yet begun selling its products, then, under the pre-operating expense doctrine developed by the courts, its research expenses have not been incurred in carrying on an existing trade or business.

Accordingly, even though research expenses are deductible, they are not eligible for the credit.

The reason for the restriction arises from a desire to prevent individual investors in research and development partnerships from claiming the credit against taxes attributable to investment and other income. However, that purpose could be accomplished by coupling the restriction on the credit with the new passive loss rules. If necessary, the credit could be restricted to the tax attributable to business income as opposed to investment income.

Since the credit is designed to encourage research in the United States, start-up high technology companies should be entitled to a credit for their research activities.

Conclusion

We now have some six years' experience with an R&D tax credit. The credit has become a major component of tax policy in support of increased research and development. Some of the problems in the design of the credit's base have bean mentioned in CORETECH's testimony. Among these problems is the inability of start-up companies to obtain the benefit of the credit for R&D expenditures. AEA urges the Committee to consider the proposal of AEA to make R&D expenditures of start-up companies eligible for the credit . CORETECH in its statement here this morning has endorsed the AEA proposal and we believe, Mr. Chairman, that legislation, such as that proposed in S.58, The Research and Development Incentive Act, a bill which the Chairman has introduced with Senator Danforth of Missouri to make permanent and to increase the R&D tax credit, will be greatly strengthened by thoughtful modifications to the credit along the lines proposed by the American Electronics Association. I know for certain that such changes will be very, very helpful to start-up companies such as mine.

Thank you.

Senator Baucus. Gentlemen, one of the most oft-repeated arguments we hear is that this credit isn't needed; companies are going to spend, anyway. Dr. Saloom, you to some degree said that, well, sure, we have got to compete; we have to develop gallium arsenide and other companies are developing it. Japan is. We have got to develop it, too, so we are going to have to spend what it takes to develop it.

Then you went on to say the credit made you more aggressive; you are more firm in your dedication to develop the product.

Dr. Saloom. Yes, sir.

Senator Baucus. I wonder if you could address the argument that the credit is not needed, because a company is going to do the research anyway? You started to address that by saying you are more aggressive in pursuing gallium arsenide, but could you explain a little more fully what you mean?

Dr. Saloom. It was in effect a mentality change. The CEO became much more receptive to increasing the R&D. We didn't go out into other alien fields and start new programs that were not in a way central to our skills and central to our sector of the market. And I don't know that I can say on what day or what event occurred; but as the Research Director, I saw more encouraging—not quantifiable—you know, like the average statistics that the economists presented. I am one of those averages. But I can't say that we went after that thing that we would have gone after; rather, we took more risk.

I was able to propose riskier programs. And on those programs where we already saw ourselves ensconced in the market, with competition, we just were more aggressive. We just invested more; And when I say it was the message that you sent, it did affect us moreso than the economic effect in many ways because the operation chief really didn't know what those economists said this morning—that it was two percent; we thought it was 20, or 25. We didn't do that fine honing in that regard.

I only found out it was that low this morning. [Laughter.]

Senator Baucus. Mr. Morton, what about H-P? You have to compete with Japan and other countries. You have to spend the money on research and development in order to compete, to boost your sales. Aren't you going to spend the money, anyway? Why do you need the credit?

Mr. Morton. Well, we will spend a lot of the money, anyway, and we historically have. I know it has made a positive difference to Hewlett-Packard because I have seen it happen and I have participated in discussions where decisions were made partly influenced by the availability of the credit.

Our R&D expenditures as a percent of sales has gone from 9.5 percent at the beginning of the tax credit to 12 percent today. Not all of that is due to the tax credit; there is no question about it. Competition has gotten tougher, and we have found reasons to spend more in many areas; but it has been a factor. The cost of doing R&D was reduced by the tax credit. It enabled us to spend more and to still maintain a reasonable performance in terms of our overall profitability. There isn't any question in my mind that it has had a positive impact on the amount of R&D that we spend.

Senator Baucus. How much of an impact? What would you say?

Mr. MORTON. Well, I think we have used essentially all of it. I know the numbers for us. I think that all of the credit that was made available went into incremental R&D for our company.

Senator BAUCUS. Mr. Pherigo, what about you?

Mr. PHERIGO. As you know, I don't have the luxury of the tax credit being available to me. There is one important thing, though, about the Senate bill pending, and that is its permanence. As a business planner, it really is essential to me to know that what you say is there today is going to be there tomorrow, and the next day, and the next day.

Senator BAUCUS. Do any of you know of any instances where there is less R&D expenditure because the credit dropped from 25 to 20 percent? Did that have any effect on anybody?

Mr. PHERIGO. I can tell you that I have looked at the current structure and have been considering exactly what the economists talked about today: How can you get the most bang for your buck? Is it by playing the game and going to zero base during one year and then looking at the next year and seeing what you can do? I think the structure causes some problems.

Senator BAUCUS. Dr. Mark, let me just give you a crack at that argument that you have to compete so you are going to spend the money, anyway.

Dr. MARK. May I approach that subject from a slightly different viewpoint? In listening to the discussion this morning, I have a feeling that we are trying to fine-tune the system beyond the point where it makes much sense to do so.

You start out with the assumption that research is a good thing. I have given you some examples of what has come out in the past. This is not a short history, as I have said. This is something that we in our—and it is not too large a way to say—our Western way of doing things. This is a central element of the Western civilization—the creation of new knowledge and its application. When you try to fine-tune it, the law of unintended consequences takes over, and you start doing things that become disincentives after a while. I would urge, Mr. Chairman, the simplest possible approach, which is that you say research is a good thing; basic research is an important thing for this country to do and that you make it easy for people to do that.

We are out worrying too much about just exactly where opportunities are and so on, and with the clear understanding that some people are going to take advantage of it; and there may be some embarrassments. But I would say, by and large, the historical evidences that the output and the results are so important that I would say the best thing is just to get on with it.

Senator BAUCUS. Thank you. Senator Danforth?

Senator DANFORTH. Mr. Chairman, I have only five minutes, and I want to take one minute asking that the business people here answer a question, and then the final four minutes I would like to address Chancellor Mark. To the business people: Is there any doubt in your mind that you can't make R&D decisions on a two or three year bases? These are long term decisions, and the time has come to make this a permanent feature of the Internal Revenue Code.

Dr. SALOOM. No doubt.

Mr. **Morton**. Absolutely.

Senator **Danforth**. No doubt?

Mr. **Morton**. No doubt.

Senator **Danforth**. Very important to try to make it permanent?

Mr. **Morton**. Absolutely.

Dr. **Saloom**. The basic research credit and the R&D credit, I would distinguish both, because two years is just not enough to develop the warm relationships I need with my colleague here.

Senator **Danforth**. Right. I want to first say that I really appreciate your testimony. I am sorry I wasn't here from the beginning of your testimony, Dr. Saloom or Chancellor Mark; but I very much appreciate your testimony. It is very, very helpful to this committee.

Mr. Chairman, I want to call the committee's attention to a somewhat different but very related issue. On page 9 of Dr. Mark's testimony—in his prepared testimony—he says:

> The other major tax provision I wish to discuss has to do with financing of university research facilities. In recent years, the tax exempt securities market has become an important source of funds for building new laboratories. Last year under the Tax Reform Act, Congress imposed a $150 million limit on the tax exempt financing of private non-profit institutions. Although this provision does not affect public universities like the ones in The University of Texas System, it will affect many of our nation's foremost research universities, and for that reason we should all be concerned.
>
> I hope that Congress will create a special category of research facilities and see to it that their construction can be financed under favorable tax exempt terms. Just as in the case of basic research tax credit, there is no doubt that such a provision is, indeed, good public policy.

This statement is remarkable because we are used to people coming here and testifying about matters that will help them. This won't help Chancellor Mark because he presides over a public system. They are not affected by the institutional cap. I think that this kind of exception to the cap is one that maybe we should introduce and work on. We are looking for ways in which we can improve our research capabilities in this country.

What we did last year was to impose a cap on funding for just this type of thing: building labs, buying very expensive equipment, the kinds of things that these bonds have been used for. The cap is applied, as I understand it, to some of our really great research institutions. It is almost a targetted disincentive, to major investment and research facilities by some of the great research——

Dr. **Mark**. That is why I put that paragraph in because, you see, if you look at the smaller places, the cap doesn't apply to them. They don't have that much bonding capacity outstanding. It is the Harvards and the Cornells and the Washington Universities—at St. Louis, which is the one I think you are talking about—that are affected by this.

And I think it is very, very important to do something about that.

Senator **Danforth**. Could you spell out in my remaining time what is involved here? What the problem is? And why this is important?

Dr. **Mark**. The problem, Mr. Chairman and members of the committee, is that construction and equipment purchases, that is long-term equipment—equipment that lasts for a long time—in most universities is funded through the sale of revenue bonds or bonds backed by endowments or by other income that we have. We sell bonds based on our endowment. We sell bonds based on our income—tuitition revenue, things like that.

These bonds have been in the past been tax exempt, and therefore they were safe and relatively good investments for institutional investors and other people of that kind. Obviously, if the tax exemption disappears, it is harder to sell these bonds, and it is more difficult for us to obtain or secure the funds to build the facilities at universities required to do research.

Our Board of Regents at their last meeting in April approved the construction of an electronics research facility at our Austin campus, and we have a $40 million bond issue out to do that—to build that building. Now, my judgment is that that building will pay for itself many times over before we tear it down 40 years from now and replace it with something else. And it will pay for itself because of the kind of things that I showed you here, because of the kind of work that is going to go on there.

Senator DANFORTH. What was the cost of that?

Dr. MARK. $40 million.

Senator DANFORTH. $40 million?

Dr. MARK. Now, by the way, I should say that only $20 million comes from the bonds. The other $20 million comes from private sources, that is we are collaborating with the industry already to get money in.

Senator DANFORTH. The point is that these facilities are enormously expensive.

Dr. MARK. Yes, they really are.

Senator DANFORTH. For good reasons, and bond raising has been a key element.

Dr. MARK. That is exactly right.

Senator DANFORTH. And some of these major universities—research universities—are right at the top now.

Dr. MARK. That is right.

Senator DANFORTH. Isn't that correct?

Dr. MARK. That is correct.

Senator DANFORTH. They are right now at the top; and therefore, we have said they cannot issue tax exempt bonds. You cannot get the favorable bond rate to finance these extraordinarily extensive research facilities.

I think that is a very good point, and I think it is remarkable because it doesn't affect your institution.

Mr. Chairman, maybe we could have some discussion in this area also.

Senator BAUCUS. Right. I think that is a good idea because, as I understand it, too, university research facilities are getting old compared to industry research facilities.

Dr. MARK. Equipment, by the way, is as important as the buildings here because we also buy equipment on that same financial arrangement.

Senator BAUCUS. Yes. Senator Chafee?

Senator CHAFEE. Thank you, Mr. Chairman. First, I want to welcome back Dr. Hans Mark. It was my privilege to be associated with him when he wore another hat in the Pentagon and did a wonderful job there, particularly in areas that were extremely important to the intelligence operations of the U.S. So, I am glad you are back. The University of Texas is a university system that is lucky to have you.

Mr. Chairman, I would like to stress a point that was made by Mr. Morton. That is on page 8 of his testimony. Regard section 861 and the allocation of R&D expenses. Many folks talk about how we might lose those research and development facilities overseas, and therefore, we won't have those particular jobs. But the point that Mr. Morton made is that the manufacturing activity follows the R&D; and so, you are not talking just about the R&D jobs. You are talking a lot more jobs than those associated with the R&D. I would commend to everyone that middle paragraph on page 8 of Mr. Morton's testimony, where he says: "When a product is developed in a particular location, it is typically much easier to manufacture at that same facility or nearby than to transfer manufacturing responsibility for the product to another country."

So, we are living in a dream world if we think that, oh well, we might lose that R&D to a lab overseas, but you don't transfer the development they effect over there and bring it back here. As Mr. Morton's testimony goes, whether it is France or Bristol, England, or wherever it might be, he points out that the manufacturing stays there. The result of conducting R&D offshore is typically that the manufacture of any products developed is conducted offshore as well.

I think it is extremely important that we remember that. Mr. Morton, I would ask you: What do you think of the compromise? You went for it, but sometimes people get into compromises—they are beaten into them—because something is better than nothing. I don't know whether we ought to have a compromise. Why not go all out? What does 67 percent mean? And then, of course, you may get a portion of the balance to domestic sources, as I understand it. So, 67 is the minimum, you can get more.

Mr. MORTON. That is correct. I guess it was in the spirit of recognizing that there are serious and real problems in terms of revenue generation and understanding that at some point a compromise is wise; and I think we felt that this was the course that we wanted to support on that basis. I think it goes substantially in the direction of providing the kind of incentive and support we need to continue a high level of R&D expenditures in the United States, and I think by having that made permanent, coupled with an R&D tax credit permanency, we would actually feel quite good and would not consider it a serious compromise in terms of the objectives.

Senator CHAFEE. Well, I guess a bird in the hand is worth two in the bush, and you are the people that we look to. What do you say, Dr. Saloom?

Dr. SALOOM. I look at it from a research and development point of view. Again, on the permanency issue, it has been hanging around for a long time, and it was just the uncertainty. In our company, it is not a major issue—in our company—but it is one of the principal items on CORETECH's agenda.

And we have had many discussions. We are pleased that the compromise was reached. From the people I have talked with from the various industries, I think Dean's comments pretty much represent the people I have talked with in CORETECH.

Senator CHAFEE. I don't suppose, Mr. Pherigot, you are involved with it yet, except you are speaking for the AEA on this issue?

Mr. PHERIGO. Yes, sir.

Senator CHAFEE. What are your thoughts?

Mr. PHERIGO. I haven't really considered it. I am worried about Reston, Virginia and Metropolitan Washington.

Senator CHAFEE. I got that impression. I saw an ominous line in your testimony somewhere that your thoughts are lying in Reston, Virginia, and keeping your operation going. [Laughter.]

I would like to take a poll here on your preference. I mentioned in my opening remarks, and I think you were present, Mr. Morton, when I took a little poll on this same subject. I want to see whether your views have changed.

What is most important to you, increasing the credit to 25 percent or making it permanent? I remember how you voted, Mr. Morton, but you are entitled to change. [Laughter.]

So, how many vote for the permanency as being more important that the 25 percent?

[Mr. Pherigo and Dr. Mark raise their hands.]

Mr. MORTON. Permanency at 20 percent?

Senator CHAFEE. Permanency at 20 percent. Yes. As opposed to indefiniteness with 25 percent? Dr. Saloom, you are not voting?

Dr. SALOOM. I won't vote; that is a question that is hotter in the summer than it is in the country. [Laughter.]

If we really want to incentivize research and development, permanency is extremely important; if we want to do the quality research that this nation needs.

On the other hand, if we really want to incentivize research and development, it can't be done on the cheap.

Senator CHAFEE. On that basis, I suppose you would vote for 50 percent?

Dr. SALOOM. No, I think Dean Morton made the comment that we are living here in a society where we do have a deficit and so on. Certainly, we have always kept that revenue loss in mind. But from the research point of view, it is clear that if that incentive were larger—and I don't think it is linear—I think there would be a corresponding, more vigorous effect.

But on the other hand, we are living in the reality of deficits. So, I can't vote on that because, to me, both are very important. Permanency as a research planner is perhaps more important, I would say, from my personal point of view. But the more research we would do if it were done at 25 percent than we would do at 20 percent.

Dr. MARK. I wonder if I could just interject a comment here, Mr. Chairman? One thing you might consider is this: If you are worried about the cost of the choice that you gave these gentlemen, I would have to agree certainly that permanency from the university's point of view is even more important; we are permanent.

Now, what do you tax? If you are going to tax something, tax the product. Don't tax the creation of the products. Make up your money by putting a tax on the things these folks sell rather than on taxing what they try to create.

Research, sir, is the creation of wealth through knowledge. Okay? The components of the aspirin that I showed you are carbon, hydrogen, and oxygen. They are cheap, as cheap as the air. What is valuable is the arrangement of these elements in the molecules so that it kills pain, and that is knowledge. Don't tax that. Don't tax the creation of the knowledge; tax the products. You have got to make that commitment.

Senator CHAFEE. I am not going to dispute what you say. Thank you very much, Mr. Chairman. Nice to see you.

Senator BAUCUS. Thank you.

Dr. MARK. Thank you, sir.

Senator BAUCUS. Senator Danforth?

Senator DANFORTH. Mr. Chairman, I just wanted to ask Dr. Saloom a question.

Senator BAUCUS. If you want to leave, Dr. Mark, go ahead. Thank you.

Dr. MARK. Thank you very much.

Senator BAUCUS. And thank you for your testimony. We appreciate it very much.

Senator DANFORTH. When I was asking Dr. Mark about the institutional cap problem, Dr. Saloom indicated that he had a comment on it, but my time had run out. So, Mr. Chairman, with your permission, could you give Dr. Saloom whatever time you wish for his response?

Dr. SALOOM. With your permission.

Senator BAUCUS. All right. Go ahead.

Dr. SALOOM. Research and development in America is a very capital and intensive operation. It is no longer the test tube and beaker affairs that it was; and if we don't want our equipments to be a little behind the Smithsonian, then we really have to do something about increasing not only the facility, but the equipment in that facility.

And even in an industrial lab—the type we have—that doesn't do that much basic research, we have to change our equipments in a three to four year period. As silicone, for instance, from two inch to three inch to four inch to five inch and so on, it is not uncommon—at least in the front end of our technology, which is closest to the university work—that we have to change our equipment and get new equipment every three to four years, and it is very expensive.

So, in that sense, to speak as an industrial person, to agree with my university colleague here that he trains the discoverers, we hire them, and they continue to discover with us. We would like him to make that transition a little smoother.

Senator DANFORTH. Do you have any doubt that there will ultimately be a cap on——

Dr. SALOOM. I am particularly interested that that cap be removed, and I think it is not very expensive. At the most, I have heard estimates that it well under $20 million per year. It is not an expensive issue, but more importantly, emotionally, I think I may be quoting the Texas president here. We don't want a wall of ice between our public and our private universities of research; and in that sense, that is unfair. It spreads them apart, and we don't need that kind of competition in America in our research universities.

That is why I particularly wanted to comment, to support my colleague from Texas.

Senator DANFORTH. Thank you very much.

Senator BAUCUS. Mr. Pherigo, I wonder if you could explain more specifically your ideas for startups and developing companies and what changes if any we should make in the credit to help smaller companies and startup companies take advantage of the credit so they can contribute more significantly to research?

Mr. PHERIGO. One point is that I really do understand the Treasury position. Most startup companies do not have a tax liability, so the current structure really doesn't work very well in that. I guess the most that I could expect would be some kind of tax carry-forward so that, whenever I do develop product and I am hopefully successful, that I do have some accrual that carries forward into that.

The one thing that concerns me about the Tax Reform Act of 1986 is the limitation it places on business form. As you know, sole proprietorships, partnerships, Subchapter S corporations are very constrained on what they can receive in a tax credit under that environment, and most startup companies take initially one of those forms.

So, I think the business form issue needs to be looked at to really provide the maximum encouragement to startup companies.

Senator BAUCUS. Mr. Morton, Dr. Mark said what we need most is permanence in the credit. Second, we need simplicity. Do you find the current credit and regulations unnecessarily complex, or are they about right?

Mr. MORTON. I am not necessarily the right one to ask about that because I am not familiar in detail with the administrative implementation. However, it is my impression that it is relatively straight-forward and imposes no particular burden on us in administering the various elements of that provision. So, I understand that there are things that could be simplified; there are even some technical elements that relate to the way it works that could make it more effective. I think some of the ideas about indexing are interesting; but I would have to say, on the basis of my knowledge of it, anyway, the complexities are not a problem for my company.

Senator BAUCUS. Dr. Saloom?

Dr. SALOOM. It is not complex.

Senator BAUCUS. I am sorry?

Dr. SALOOM. It is not complex, at least from the receiving end; doing the research side, it certainly is not complex. It is rather comfortable.

Senator CHAFEE. Mr. Chairman, I just want to congratulate you for assembling this panel. All of us have sat through many, many panels in our time on this committee; and I think this is one of the very best we have had.

Senator BAUCUS. The compliment is to our panelists. They have been wonderful. We thank you all very much.

Senator CHAFEE. I want to thank you all very much. I know Mr. Morton certainly has come a long way for this hearing and Dr. Mark likewise. We want to thank you all very much. It has been very, very helpful to us.

Senator **Baucus**. Also, we are making progress. That is, there has been a coalescence around the 861 solution and also I think on our bill, Senator Danforth, on the credits. So, we are making progress here, and you have had a large part to do with it. Thank you very much.

Mr. **Morton**. Thank you very much.

Dr. **Saloom**. Thank you.

Mr. **Pherigo**. Thank you.

Senator **Baucus**. The hearing is adjourned.

[Whereupon, at 12:18 p.m., the hearing was adjourned.]

[By direction of the chairman the following communications were made a part of the hearing record:]

Amoco Corporation

STATEMENT BEFORE THE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT OF THE UNITED STATES SENATE COMMITTEE ON FINANCE

Amoco Corporation is committed to a strong research and technology development program, giving Amoco a leading edge in petroleum and other emerging or developing technologies. Amoco's expenditures for research and development were $217 million in 1986, compared with $196 million in 1985, and $176 million in 1984.

In the area of exploration and production, scientists at our Tulsa Research Center have developed better and less expensive methods of obtaining technical data from the bore holes we drill and have improved our drilling technology. For example, our explorationists now are using a miniature sonic scanning device that Amoco scientists developed as a downhole tool. When lowered into a wellbore, the device transmits data about the hydrocarbon potential and productibility of rock structures thousands of feet beneath the surface. Another Amoco-developed wellbore tool records a different form of sonic wave to provide information about the porosity of reservoir rock. Porosity is a measure of the percentage of void space within rock and is one criterion of its suitability as a reservoir for oil and gas.

In the area of processing, having recognized the need to rapidly solve problems associated with port-fuel injector systems being used in many new automobiles, and the need for high-octane petroleum components to replace tetraethyl lead in the company's lead-free gasolines, Amoco scientists developed, and the company introduced, our new Amoco Ultimate and Amoco Silver gasolines in 1986. Our scientists also are finding new ways to increase yields of light products such as gasoline and heating oil from heavy crude oils and alternative resources including coal, tar sands, oil shale, and natural gas.

Not all of our research efforts are related to oil and gas production and processing. Amoco scientists are carrying out studies on advanced optical and electronic devices that use new semiconductor materials. Semiconductors the size of a grain of salt are produced that emit laser light. These tiny lasers can be used in fiber-optic communications, compact disk players, and optical memory systems. Lasers are being used to develop new ways to create chemicals, test high-speed electronic chips, and process plastic and semiconductor materials. Devices that use several different amorphous semiconductor materials are being explored for use in laser printers, sensors, and other optoelectronic equipment.

The importance of continuing research and technology development activities by Amoco and other U.S. companies cannot be understated. The performance of research and technology development activities by U.S. industry is crucial to the maintenance and advancement of technological innovation. Industry is a crucial link in the innovation process; it manufactures products for sale in the marketplace or utilizes processes to increase productivity. The industrial sector provides the commercialization and diffusion activities necessary to insure that a new idea, in fact, becomes an innovation. Industry provides the Government with the technologies needed to secure the nation's defense, health, and welfare since the public sector has neither the mandate not the capabilities to manufacture. In addition, industry responds to the demands in the marketplace, or creates new needs, to provide the goods and services which fuel our economy.[1]

As Senator Baucus has noted, "it is well established that companies cannot recapture the full economic benefits that are generated by their R&D investments. So unless [Congress] provide[s] incentives, companies will under-invest." Amoco relies on these incentives and incorporates the associated tax benefits into its analysis of proposed research and technology development projects. The availability of the research tax credit and the allocation and apportionment of research and experimental expenditures to U.S. source income, directly and significantly, impact Amoco's decision to approve and fund a research and technology development project.

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[1] U.S. Congress, Joint Economic Committee, 99th Cong., 2d Sess., Technology and Trade: Indicators of U.S. Industrial Innovation 15 (Comm. Print 1986).

The recently introduced legislation to make the research tax credit permanent and increase the amount of such credit (S. 58), and to retroactively reinstate on a permanent basis the research and development allocation rules (provided on a temporary basis in prior tax acts) that allocate all amounts allowable as a deduction for qualified research and experimental expenditures to U.S. source income (S. 716), responds to our need to know that such tax incentives are available and that such tax incentives may be relied on in making research and development project decisions now and in the future.

However, the Staff of the Joint Committee on Taxation states that if the proposal (S. 716) is adopted such that U.S.-performed R&D expenses are deducted exclusively from U.S. source income, and royalty income from foreign affiliates attributable to this R&D is allocated exclusively to foreign sources, a mismatching in sourcing rules results and there is a potential for double deduction of this R&D expense.[2] The Staff of the Joint Committee on Taxation further states that if the proposal is adopted, this double deduction problem can be cured by treating all or part of royalty payments from foreign affiliates as U.S. source income in situations where the parent deducts R&D exclusively from U.S. source income.[3]

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[2] U.S. Congress, Staff of Joint Committee on Taxation, 100th Cong. 1st Sess., Description of Proposals Relating to Research and Development Incentive Act of 1987 (S. 58) and Allocation of R&D Expenses to U.S. and Foreign Income (S. 716) 50 (Comm. Print 1987).

Amoco Corporation opposes the introduction of still another sourcing rule. Section 862(a)(4) of the Internal Revenue Code of 1986 specifically provides that royalties from property located without the United States, or for use of or the privilege of using such property without the United States, are foreign source income.[4]

The statutory scheme for the sourcing of income has been the subject of legislative amendments and has caused much confusion for taxpayers. The Deficit Reduction Act of 1984 amended IRC section 367(d) to provide that a transfer of intangible property to a controlled foreign corporation as described in IRC section 351, or in certain corporate reorganizations described in IRC section 361, is treated as a sale. On the transfer of the intangible property, the transferor is treated as receiving amounts that reasonably reflect the amounts that would have been received under an agreement providing for payment contingent on productivity, use, or disposition of the property; such amounts are treated as ordinary income from sources within the United States. As part of the Tax Reform Act of 1986 (IRC section 865), Congress enacted a new, clear set of rules for the sourcing of income from the sale of personal property, in addition to retaining the general sourcing rules set forth in IRC sections 861 and 862. Taxpayers do not need any more rules for the sourcing of income, (usually resulting in the creation of more U.S. source income); taxpayers do need a set of permanent rules for the allocation of deductions for R&D expenses incurred in the United States for the benefit of a U.S. company's trade or business activities.

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[3] Id.

[4] IRC section 862(a)(4) provides that--

> (a) The following items of gross income shall be treated as income from sources without the United States:
>
> (4) rentals or royalties from property located without the United States or from any interest in such property, including rentals or royalties for the use of or privilege of using without the United States, patents, copyrights, secret processes and formulas, good will, trade-marks, trade brands, franchises, and other like properties. IRC section 862(a)(4).

Amoco Corporation does not advocate the adoption of the proposal as set forth in S. 716, providing that U.S.-performed R&D expenses are deducted exclusively from U.S. source income, if this will result in treating all or part of royalty payments from foreign affiliates as U.S. source income in situations where the parent deducts R&D exclusively from U.S. source income.

Amoco Corporation supports the recently introduced legislation to make the research tax credit permanent and to increase the amount of such credit (S. 58). Amoco Corporation also generally supports the legislative proposal to retroactively reinstate on a permanent basis, the research and development allocation rules (provided on a temporary basis in prior tax acts) that allocate all amounts allowable as a deduction for qualified research and experimental expenditures to U.S. source income (S. 716), but not if this proposal results in a new sourcing rule treating royalties from foreign affiliates as U.S. source income.

In recognition of the significant revenue drain that will be caused by providing for the allocation of 100 percent of qualified research and experimental expenditures to U.S. source income and the potential enactment of a new sourcing rule requiring royalty payments from foreign affiliates to be treated as U.S. source income in situations where the parent deducts R&D expenses exclusively from U.S. source income, Amoco Corporation agrees with the compromise proposal which allows U.S. companies to allocate 67 percent of domestic qualified research and experimental expenditures to U.S. source income (67 percent exclusive place-of-performance apportionment), with the remaining 33 percent allocated on the basis of either the gross sales or gross income method set forth in Reg. 1.861-8(e)(3), and no provision to change the general sourcing rule for royalties as set forth in IRC section 862(a)(4). For the reasons stated above, Amoco Corporation accepts the compromise as a permanent solution to the research and experimental expense allocation issue.

I appreciate the opportunity to make this statement to the Subcommittee on Taxation and Debt Management of the Senate Committee on Finance on behalf of Amoco Corporation. Amoco Corporation commends the work of the many Senators involved in introducing and supporting the Research and Development Incentive Act of 1987. The staff of the tax department of Amoco Corporation, would be pleased to work with Subcommittee members and Administrative representatives to see that effective legislation concerning tax incentives for research and technology development activities performed by U.S. companies in the United States is enacted by this Congress.

AMOCO CORPORATION

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STATEMENT

OF

RICHARD D. GODOWN

PRESIDENT,

INDUSTRIAL BIOTECHNOLOGY ASSOCIATION

FOR THE

SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT

OF THE

SENATE FINANCE COMMITTEE

APRIL 3, 1987

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The Industrial Biotechnology Association represents fifty-seven companies that use genetically-altered living organisms in industrial processes. In ancient times, man used microoganisms to produce bread, wine, beer, and cheese. Today, biotechnology techniques are used to develop new medical, agricultural, chemical, energy, and waste clean-up products that will enhance our future, and our children's future.

Fueled by billions of research dollars, the investment in American biotechnology is beginning to pay off. In the health care field, recombinant human insulin is available to replace the pig and cow insulin used by most diabetics but to which some are allergic. Among other biotechnology health care products now available is a proven cure for a rare form of leukemia, a vaccine for hepatitis type-B, and a drug that prevents kidney rejection in transplant patients. Biotechnology led to the isolation of the AIDS virus and to the development of the AIDS diagnostic products now used by doctors. Research into an AIDS vaccine is progressing at several biotechnology companies. In 1987, FDA approval is expected for the first block-buster biotechnology product, a naturally-derived protein that dissolves the arterial blood clots that cause heart attacks.

Every one of these important new products was developed by the domestic biotechnology industry that began its existence only fifteen years ago, and now includes an estimated 400 U.S. firms. This includes 300 new firms that were founded specifically to research and develop the new life science technologies that were pioneered in the early 1970's, including genetic engineering technology, monoclonal antibody technology, and cell culture technology. The domestic biotechnology industry has grown from 1981 revenues of zero to 1986 revenues of $400-600 million with double that anticipated for 1987. The industry has already created thousands of new, high-paying jobs, with additional jobs being created every day.

Clearly, biotechnology is America's future. New health care products are just the beginning. Within the next five years, new biotechnology products will begin to revolutionize American agriculture, producing plants that can withstand drought, frost, or brackish water; microorganisms that produce organic, biodegradable pesticides; leaner and healthier pork from low-body-fat pigs; and many other products that will increase the quality of American foods and the environment, while decreasing the farmer's cost of production.

It's plain to see why everyone is so excited about biotechnology and so proud of America's leadership role.

But the future of biotechnology may not be as glorious as its past without a permanent R&D tax credit restored to its original rate.

The Industrial Biotechnology Association strongly urges your support of S. 58, more specifically:

- Restoring the research credit to its original 25% rate, and

- Making the research credit permanent.

Background

Enacted in 1980, the research credit originally allowed a 25% credit for qualifying R&D expenditures in excess of a three year moving average. This moving average was placed in the law so that only new or incremental R&D expenditures would qualify for the credit. Allowed to expire in 1986, the R&D credit was retroactively extended until December 31, 1988, but the rate was reduced to 20%. S. 58 would make the credit permanent and restore the rate to 25%.

R&D is an important factor in promoting higher productivity, improving our standard of living, increasing U.S. competitiveness, and reducing the U.S. trade imbalance.

R&D Key to U.S. Economic Growth

R&D plays a key role in U.S. economic growth and is the sine qua non of innovation. According to Edward Dennison of the Brookings Institution, innovation was responsible for 64% of the gains in U.S. labor productivity between 1929 and 1982. Since 90% of the goods and services consumed in the U.S are produced in the U.S., improving U.S. productivity is a key in improving our living standards.

Many companies are investing significantly in new technologies, such as biotechnology, to produce both traditional products as well as ones that are entirely new. Biotechnology will help America to promote increased efficiency in agriculture and evolve a new approach to the manufacture of human health care products, animal health care products, and chemicals.

R&D is also an important factor in increasing the U.S. competitiveness in the fight to reduce the U.S. trade imbalance. High tech exports have made a disproportionately large contribution to U.S. trade performance, accounting for 42.2% of U.S. exports of manufactured products in 1985. In contrast to the overall decline in the trade balance, the U.S. trade balance in high tech products increased to a $25.5 billion in 1980 from $6.1 billion in 1970. However, R&D is important to all industries, not just high tech industries, since technology advances are necessary to improve design and manufacturing processes, create new products, and to offset relatively higher U.S. labor costs. If the U.S. is to correct its $140 billion trade deficit, it must invent its way out of the problem. S. 58 is an important step in that direction.

Finally, research spending benefits not only the private spenders, but society as a whole, as the benefits of such research are adopted for other uses throughout the economy. In fact, studies indicate that the rate of return to society from private R&D spending is more than two times greater than the rate of return to the investors.

The R&D Credit Is Effective

The research credit is an effctive incentive for increasing private sector spending. In a recent study of the R&D credit, Martin Bailey and Robert Lawrence of the Brookings Institution conclude that the credit has clearly increased R&D spending by U.S. companies. Their study indicates that the ratio of R&D spending to output, during the period when the R&D tax credit was in effect, grew more than twice as rapidly as it did in the five years prior to enactment of the credit. They estimate that the R&D credit increased R&D spending at an average rate of about 7% between 1982 and 1985, adding between $2.6 billion and $2.9 billion a year to R&D spending. This amounts to about $2 of R&D for each $1 of lost revenue . Unfortunately, the research credit was cut back to 20% as part of the 1986 tax bill. The Bailey and Lawrence study estimates that the effect of reducing the credit to 20%, in conjunction with lower overall corporate tax rate, is to provide only about a 5% incentive versus the 7% incentive the credit provided over the 1981 through 1985 period.

The research credit is an effective and important incentive for increasing private R&D spending. The results of this increased R&D spending will benefit the entire economy which will more than make up for any "static revenue" loss.

Credit Should Be Permanent

Making the credit permanent will remove the uncertainty which has had an adverse impact on its effectiveness. Corporate R&D expenditures involve long-term, multi-year projects. Making the credit permanent would also enable R&D planners to include the benefit of the credit in their calculations as to which R&D opportunities should be undertaken, thus increasing the effectiveness of the credit.

Permanent 25% Credit Will Not Reduce Tax Revenues

There is an old sales adage that one must spend money to make money. This is certainly true in the case of the R&D credit. Bailey and Lawrence, in their 1984 study, indicate that the tax revenue lost by retaining the 25% credit and making it permanent would be more than paid for through GNP increases generated by innovation and increased productivity. They estimate that a permanent 25% credit could boost GNP by as much as $17 billion by 1991, which would more than offset the Joint Committee estimated revenue loss.

Conclusion

The processes of biotechnology can -- and must -- become a new source of economic vitality for America. There is no question that the agricultural, health, and chemical products of biotechnology have the potential to improve the quality of our lives, and the lives of people the world over, to a remarkable degree. There is also no question that this country has the scientific, manufacturing, and marketing resources to maintain its current leadership in biotechnology, and to derive significant economic benefits from that position.

In summary, we submit the following:

- o The research credit is an effective incentive in increasing biotechnology R&D spending.
- o R&D is important to all industries and has tremendous spill-over effect throughout the economy.
- o Increased R&D is important to promoting higher U.S. productivity, providing an improved standard of living, increasing U.S. competitiveness, and lowering the trade imbalance.
- o Restoring the 25% rate will establish a more effective level of incentive.

Making the credit permanent will improve the effectiveness of the credit by enabling corporate R&D planners to include its benefit in their cost benefit calculations of R&D funding projects. The Industrial Biotechnology Association strongly urges your support of S. 58.

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May 1, 1987

The Honorable Max Baucus
Chairman
Senate Finance Subcommittee
on Taxation and Debt Management
Room SH-706
Hart Senate Office Building
Washington, D.C. 20510

STATEMENT ON BEHALF OF THE MOTOR VEHICLE MANUFACTURERS ASSOCIATION IN SUPPORT OF S. 58

Dear Senator Baucus:

We represent the Motor Vehicle Manufacturer's Association ("MVMA"), which is comprised of the principal manufacturers of domestic automobiles, trucks and buses.[1] MVMA supports S. 58, which makes the research tax credit permanent at a 25 percent rate.

MVMA believes that:

1. The credit for research expenditures should be permanent.

2. The preferred rate for the credit is 25 percent.

3. It should be emphasized that the credit can be used for qualified research by all industries to

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[1] The member companies of MVMA are: American Motors Corporation; Chrysler Corporation; Ford Motor Company; General Motors Corporation; Honda of America Mfg., Inc.; LTV Missiles and Electronics Group, AM General Division; M.A.N. Truck and Bus Corporation; Navistar International Corporation; PACCAR Inc.; Volkswagen of America, Inc.; and Volvo North American Corporation.

improve existing products or to apply innovative production processes.

MVMA has been a strong proponent of a research and development tax credit since the enactment in 1981 of former section 44F of the Internal Revenue Code. This initial research tax credit was, although limited in life, a stimulus to the substantial increase in research undertaken by members of the U.S. automotive industry. The U.S. automotive industry has heavily relied on the application of advances in technology to develop and improve its products.

The evolution of automobile and truck concepts as transportation modes has advanced substantially in recent years. Since the credit was first enacted important functional improvements to traditional automotive products have occurred at a rapid pace. Automotive products now have performance and safety capabilities that five years ago were either only distant predictions or barely conceived.

The substantial technological advances of recent years were nurtured by the research and development tax credit. The credit encouraged U.S. automotive manufacturers to be more aggressive, to assume additional engineering and technical risks in undertaking product development programs and projects. Some of these developmental undertakings did not produce improvements that could be commercially exploited. Others produced dramatic advances, as can be seen in the new structural and operational characteristics incorporated in recent U.S. products such as Ford's Taurus-Sable, General Motors' Fiero and Chrysler's Caravan.

The reenactment of the research credit in modified form in the Tax Reform Act of 1986 was encouraging, although it is not a complete solution. MVMA urges that the research credit be made permanent.

The general structure of the credit has been in place for six years. Both statistical and empirical data presented at the hearing before this Committee on April 3, 1987, illustrate that the credit provided an incentive for the research so urgently needed to maintain our national competitiveness. The purpose of the credit is to allow businesses to take risks where the potential market rewards of a research program are unclear. In most cases, such programs require a corporate commitment of financial and human resources over an extended period of years. The willingness of companies to make such a commitment will be substantially diminished if the availability of the research credit is perceived to be unpredictable. Moreover, the lack of a permanent tax incentive for research stands in sharp contrast to the incentives available for corporations located in Japan, West Germany, the United Kingdom and several other countries, which are our strongest rivals in the international automotive market.

MVMA also believes that a 25 percent rate is preferred to the current 20 percent rate. Although MVMA recognizes the constraints of a budget deficit, the continued competitiveness of U.S. products is a central element in maintaining our standard of living, reducing unemployment, reversing the current adverse balance of trade and continuing moderate inflation. No one can dispute that countries with the most efficient manufacturing processes and the best performing products have the most successful domestic economies.

MVMA emphasizes the importance of the credit in enhancing the competitiveness of all manufacturing industries based on scientific and engineering technology. The rules governing the credit should not unintentionally limit its advantages to the perceived "high technology" companies or to an unreasonably narrow view of what constitutes research and experimentation. The credit should favor all industries which technically and functionally improve their products and fabrication processes through scientific or engineering experimentation. Cost reduction should be emphasized as a qualified improvement.

These overall objectives require a more rational definition of qualified research in the context of applied or industrial research, which will provide economic encouragement for more abstract and fundamental research activities. This means including research activities that are justified in light of their potential to convert new basic technologies into new or improved commercial products or processes. This is where foreign competition is most severe. In the automotive industry, these improvements are very difficult to achieve in many instances, because they must be adaptable to a massive production scale involving millions of complex products.

Ongoing research that is routinely conducted to develop new or improved existing products should not be penalized. Most manufacturing industries, including perceived "high tech" industries must conduct this type of ongoing research to stay competitive in today's international markets.

Continuous research is also required by increased government regulatory requirements for new products and processes, which presumably improve performance for consumers and the general public good.

In summary, as Dr. Bailey testified before the Committee on April 3, 1987, in order to maintain international competitiveness, our domestic industries must compensate for comparatively higher labor and other costs with greater productivity and superior products.[2] Incentives for research spur this productivity and innovation. Such incentives must be strengthened and made a permanent part of our tax structure.

Thus, MVMA urges the Congress to enact S. 58. It also urges the Congress to emphasize that the research and development tax credit can be utilized for the experimentation involved in improving existing products and applying innovative production processes.

Sincerely,

F. Brook Voght

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[2] Testimony of Dr. Martin Bailey, The Brookings Institution, Before the U.S. Senate Committee on Finance Subcommittee on Taxation and Debt Management, at page 5 (April 3, 1987).

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Pharmaceutical
Manufacturers
Association

Gerald J. Mossinghoff
PRESIDENT

April 2, 1987

The Honorable Max Baucus
Chairman
Subcommittee on Taxation
  and Debt Management
Committee on Finance
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

On behalf of the Pharmaceutical Manufacturers Association, I am submitting this statement for the record of your Subcommittee hearing on April 3, 1987, on proposals affecting the incremental research credit and the allocation of research expense. PMA represents more than 100 research-based pharmaceutical companies that discover, develop and produce most of the prescription medicines used in the United States. We appreciate this opportunity to comment on the importance to the industry of the incremental research credit and a sensible policy for allocation of research expense.

Like other high-tech industries, the future of the pharmaceutical industry depends upon its ability to develop better products. The new drugs produced by the research-based pharmaceutical industry enable people to live longer, healthier and more productive lives. We are concerned about U.S. government policy affecting the environment for U.S. research.

1. Credit for Research and Experimental Expenditures

PMA strongly supports S. 58 which will make permanent the credit for domestic research at a level of 25 percent.

The research credit provisions enacted as part of the Economic Recovery Tax of 1981, which will expire at the end of 1988, should be made a permanent rule of United States tax law as an important incentive for the expansion of domestic research efforts.

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Major research projects are long-term efforts requiring long periods of lead time. The enormous costs of innovative efforts in research intensive industries, e.g., computers, electronics, pharmaceuticals, with absolutely no guarantee over availability of the credit beyond a cut-off date, increases the likelihood that the highest risk projects will not be undertaken. Making the credit a permanent incentive would give the pharmaceutical industry, as well as other research-based industries, the assurance that the credit will be available for expenditures made during later stages of products currently under consideration.

In 1979, Dr. Ronald Hansen, then with the University of Rochester Graduate School of Management, estimated that it cost $54 million in 1976 dollars to develop a new drug and obtain approval from the Food and Drug Administration to market it. The cost of developing a new drug today, using that study and adjusting for general inflation in biomedical research and development, is $113 million. Pharmaceutical companies in this country have used an increasingly larger proportion of U.S. sales revenues to finance the development of new drugs. From 1973 to 1980, the U.S. research-based pharmaceutical industry invested between 11.1 percent and 11.7 percent of U.S. sales in R&D. In 1981, the industry increased its investment to 13.1 percent of sales, and in 1986 our companies invested an estimated 15.0 percent of sales in research and development.

The U.S. should foster a climate that tilts in favor of innovative domestic research. Expiration of the research credit will reduce the after-tax income of companies available for research. U.S. industry is being challenged by foreign competitors in every field of technology. A permanent research credit would augment investment in research projects in the U.S. It is noteworthy that some of our most important commercial competitors, such as Japan, offer similar credits to their industries.

2. Non-Allocation of Domestic Research Expense to Foreign Source Income

A matter of immediate concern to PMA is the problem addressed by S. 716, which is an important measure that will eliminate a disincentive to domestic research.

Since 1981, the Congress has suspended the application of Treasury regulations under IRS Reg. Sec. 1.861-8, which requires a formula allocation of domestic research expenses to foreign source income. The mechanical effect of this formula is to reduce the credit that the U.S. otherwise allows for foreign income taxes imposed on the foreign-source income earned by U.S. companies. The more that domestic research is increased, the more foreign tax credits are lost. Treasury Department estimates indicate that following the Tax Reform Act of 1986, more U.S. companies than ever before will experience excess foreign tax credits.

The practical effect of the Treasury regulations for allocation of research expense is to offset the favorable rules provided in the Internal Revenue Code to encourage domestic research in the form of current deductions for research expense and the allowance of the tax credit for incremental research undertaken in the U.S. This is a contradictory and unwise result.

It is very important to place this matter in the international competitive context:

o Neither the Canadians, French, British, Germans, Japanese nor other industrial powers apply a similar rule to their corporations engaged in domestic research and competing abroad, thus placing U.S. companies at a competitive disadvantage.

o Foreign governments do not recognize the arbitrary accounting formula designed by the U.S. revenue authorities to allocate the domestic research expense of U.S. corporations to royalties and dividends paid by subsidiaries in their countries; therefore, they do not allow deductions in their countries for payments to the U.S. parent to correspond to the allocation. This is a fundamental point. We do not live in a world in which expenses that the U.S. arbitrarily attributes to foreign income will be acepted by foreign tax authorities.

Permanent rules adopting the incremental research credit and a prohibition against allocation of U.S. research expense to foreign income are directly related to the economic competitiveness of the United States. Innovative research translates directly into productivity and the competitiveness of our products against foreign products both in export and domestic markets. The suspended Treasury regulations are a disincentive to domestic research and should not be reinstituted.

I appreciate this opportunity to present these views of PMA. I hope they are helpful to you and the Subcommittee.

Sincerely,

Gerald J. Mossinghoff

Gerald J. Mossinghoff

STATEMENT OF THE

SCIENTIFIC APPARATUS MAKERS ASSOCIATION

ON INDUSTRY RESEARCH AND DEVELOPMENT INCENTIVES

SUBMITTED TO

THE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT

COMMITTEE ON FINANCE

April 3, 1987

The Scientific Apparatus Makers Association (SAMA) is pleased to support S. 58, the Research and Development Incentive Act of 1987, and to present its views on the need to expand and make permanent the Research and Development Tax Credit and to also make permanent a moratorium on allocating research and development costs against foreign source income under Treasury Regulation 1.861-8.

Founded in 1918, SAMA is the national trade association of the high technology scientific, clinical and process control instrumentation industry. SAMA's 230 member companies, many of moderate or small size, manufacture and distribute more than 40,000 types of high technology instruments and related laboratory products. That equipment is used for research, production and quality control and for regulatory compliance by a wide range of industries, including chemical and pharmaceutical manufacturing, oil refining and food processing. Scientific instruments also are employed in scientific and medical research by hospitals, universities and government agencies including NIH and EPA. SAMA's members have combined annual sales of $14 Billion, and overseas sales account for between 35-40 percent of total sales. The United States currently maintains a positive balance of trade in scientific, clinical and process control instruments. However, that trade is steadily declining due to the availability of an increasing number of foreign-made state-of-the-art instruments at greater than competitive prices due to foreign research and development spending and government subsidization of industry.

Our members are keenly aware of the importance of the R&D tax credit to their international competitiveness and the improvement to our quality of life which these products bring about. According to a recent survey of our membership, SAMA companies claimed over $100 million in R&D tax credits in 1984. Total research spending by our members is roughly 6 percent of total sales. Total research spending in our industry increased by 63 percent between 1980 and 1984, while R&D expenditures as a percentage of sales rose by almost 45 percent during that time. These research spending increases occurred even though our industry experienced economic recessions in 1981-1982 and 1986-1987. Nevertheless, our industry spent a considerable amount of money on research and development activities during that time as a result of the R&D tax credit and the 1.861-8 moratorium.

I. Summary of Position

Our position can be summarized as follows:

1. The R&D tax credit should be permanently extended, and the value of the credit should be increased from 20 percent to 25 percent.

2. Congress should not delay in extending this important research incentive. Innovative corporate R&D projects typically consume 5-7, maybe 10 years with the greatest costs coming toward the end of the project. With the credit set to expire at the end 1988, it is critically important that the uncertainty over the credit's extension be resolved as soon as possible in order to allow companies to continue research projects previously undertaken in anticipation that the credit would be extended and to plan and commence future projects.

3. The uncertainty concerning allocating domestic R&D expenses to foreign source income under Treasury Regulation 1.861-8 must be permanently

resolved. A permanent moratorium would encourage firms to conduct their R&D activities in the United States and to expand those R&D activities above current levels. Allowing the 1986 legislation to become effective will significantly increase the tax liability of U.S. exporters which perform their research and manufacture their products in the U.S. for sale in world markets.

II. The R&D Tax Credit Should be Expanded and Made Permanent

It is vitally important that the Research and Development Tax Credit, currently scheduled to expire at the end of 1988, be expanded and made a permanent part of our Tax Code.

Although there are numerous reasons for U.S. companies to invest in research and development activities, it is both necessary and appropriate for the government to provide additional stimulants. Congress recognized this in 1981 when it devised the Research and Development tax credit. Prior to that time, domestic research spending as a percent of the gross national product declined by ten percent, reaching a low of 2.23 percent in 1977-78. At the same time, with the aid of government incentives, both Japan and West Germany increased their R&D spending as a percent of GNP by at least 20 percent. Thanks in part to the R&D credit, this trend is being reversed. In 1983, U.S. research spending as a percent of GNP is estimated to be 2.65% - about equal to that of Japan and West Germany.

Our Industry's Experience

A review of our industry's experience illustrates how research spending has significantly increased since the R&D tax credit was passed in 1981. Research spending in the instruments, measuring devices and process controls industry increased by 63 percent between 1980 and 1984. According to a survey conducted by Business Week magazine and based on information reported to the Securities and Exchange Commission, research spending by the largest companies in our industry rose from $578 million in 1980 to $942 million in 1984, a gain of 63 percent. For the first time, research spending actually rose during a recession. Sales were up from $13.1 Billion to $15.7 Billion, or 20 percent between 1980 and 1984. However, despite this increase in sales, research spending as a percent of sales increased by almost 45 percent during this time. We believe that the actual increases for our industry may be even higher. The Business Week statistics failed to take into account small and medium size companies whose research spending is growing faster than the industry average. In addition, it should also be remembered that these figures relate to the period when the credit was being phased-in on an incremental basis.

We believe the R&D tax credit is one of the important reasons for the recent growth in research spending. A survey conducted by a group of University of Pennsylvania economists confirms that research spending in the instruments and measuring devices industry would have been lower - by 3.7 and 5.9 percent respectively - in 1982 and 1983 without the R&D credit.

The Economic Impact and Foreign R&D Incentives

A number of studies have attested to the need for an R&D stimulant such as the R&D tax credit to achieve the optimum level of private research spending and to maintain our technological lead and competitiveness in world markets. A 1985 study, by Martin Bailey and Robert Lawrence (of the Brookings Institution) and by Data Resources, Inc. concludes that a permanent R&D tax credit would generate at least $1.2 Billion of GNP growth within one year and up to $17.7 Billion within five years. The authors further conclude that the long term economic growth produced by a permanent R&D tax credit would generate increased tax revenues that would more than offset the short term revenue cost of the credit.

Maintaining the R&D tax credit also is important to meeting the considerable tax and financial incentives that many foreign governments provide for commercial research performed within their countries. In addition to providing additional leverage to corporate R&D managers in the competition for scarce corporate funds, the R&D credit by counterbalancing the importance of foreign incentives, encourages companies to conduct their research in the United States.

The Need for a Permanent R&D Credit and its' Effect on Long Term Planning

One disadvantage of the credit is its expiration at the end of 1988. This, along with the natural bias in favor of short-term results, probably has encouraged companies to focus on short-term R&D projects at the expense of longer term, more innovative research programs. Making the R&D credit permanent would go far toward eliminating this problem. It also would allow better corporate strategic planning and result in more productive utilization of corporate funds. It would also send a clear signal to U.S. businesses that our government is truly interested in sustaining our technological leadership. This is of critical importance especially when other nations are trying to attract our industries' research and eventually their manufacturing activities.

II. The Value of the R&D Credit Should be Increased from 20 Percent to 25 Percent

Unlike many other tax credits, the R&D credit is incremental in nature. This means that companies which wish to realize tax savings as a result of the credit must continually increase their qualifying R&D spending over the average of the previous three year's levels. The value of the credit is then applied to the incremental increase in qualified R&D spending. Further, most companies have a limited amount of resources available to achieve their financial goals at differing levels of activity. Many diverse business needs, e.g., R&D, plant expansion and modernization, marketing costs, etc., must be met with these limited resources. The existence of a meaningful R&D credit provides additional leverage to corporate R&D managers in the competition for scarce corporate funds. Obviously, the higher the percentage, the greater the incentive and the more likely that the credit will achieve its purpose and stimulate additional industry research beyond which would otherwise have occurred without the credit. The Finance Committee historically has advocated a 25 percent R&D credit, and we encourage this Subcommittee to recommend a restoration of that value.

III. Congress Should Act Now to Extend the R&D Credit

Most R&D projects consume several years from planning through implementation. In order to realize the objective of the credit, and stimulate *additional* innovative research projects, the present uncertainty over whether the credit will be extended or allowed to expire needs to be resolved as soon as possible. Companies which currently are planning their research projects and priorities for the next decade, as well as hiring additional research engineers and scientists, building or expanding research facilities, cannot afford to wait until the end of 1988 or 1989 to know whether the credit will be available or whether it will be scaled back or increased in value. Therefore, we urge that the Committee expeditiously remove the uncertainty and act this year to expand and make permanent the R&D credit.

IV. The Moratorium on Imposition on Treasury Regulation 1.861-8 Needs to be Permanently Resolved

We also would like to emphasize the need for Congress to make permanent a moratorium on allocating domestic R&D expenses against foreign source income under Treasury Regulation 1.861-8. Although the R&D Tax Credit is designed to encourage companies to undertake additional research in the United States, the prospective application of Treasury Reg. 1.861-8 discourages that result. A permanent moratorium and resolution of 1.861-8 would encourage firms to conduct their R&D activities in the United States and to expand those R&D activities above current levels. Allowing the current lasw to take effect will significantly increase the tax liability of companies with export sales. One result may be a decrease in the competitiveness of our U.S.-made goods because of higher after-tax costs. Another result may be a shift in R&D activities and perhaps manufacturing to overseas locations where overall costs are cheaper and local governments totally encourage R&D activities. The legislation introduced by the Chairman of this Subcommittee represents a responsible and desired solution to this continuing problem and we urge the Subcommittee to expeditiously pass and report that legislation to the full Committee.

V. Conclusion

We appreciate this opportunity to present our views on the value and need of the R&D tax credit and a consistent U.S. policy towards encouraging R&D. The Subcommittee's interest in this important issue greatly appreciated and we look forward to working with the Subcommittee and with the full Finance Committee to extending and making permanent these important incentives for maintaining our Nation's international competitiveness and technological leadership.

STATEMENT OF THE TAX COUNCIL
ON
THE RESEARCH AND DEVELOPMENT TAX CREDIT AND ALLOCATION OF RESEARCH EXPENSE

(S. 58 and S. 716)

submitted to the
Subcommittee on Taxation and Debt Management
Committee on Finance
United States Senate
April 3, 1987

The Tax Council recommends that the incremental credit for R & D expense should be extended on a permanent basis and a full allocation of domestically performed R & D expense to U. S. income should be allowed. Therefore, the Council fully supports the objectives and provisions of S. 58 and S. 716.

There are two major aspects to the R & D issue as it relates to tax policy. The first deals with credit for qualified research and experimentation. This incentive was last extended under the TRA of 1986 but only through 1988. The rate of the credit was reduced from 25% to 20% and the definition of qualified research and experimentation was narrowed. The Council believes that a full 25% incremental tax is appropriate given our commitment to encourage technological innovation.

Also, The Council is concerned that the temporary nature of the credit is a deterrent to investment in research by American business. The results and payout from research and development are lengthy and the credit needs to be assured of a sustained period, clearly longer than two years, in order to be effective in promoting sustained research efforts. The Council urges that a permanent R & D credit of 25% be enacted.

The second aspect relates to the allocation of research expense. The Council believes that there should be a permanent solution to this issue as well. Under the Tax Reform Act of 1986, the suspension of allocating U.S. research expense against foreign source income was not continued. The reduction to a 50% standard, the one-year rule and the transfer of responsibilities to the Treasury Department to resolve this complex problem through the treaty process all add to the cost and confusion. Planning for research facilities will face new burdens in light of these constraints.

Without a permanent allocation of domestically performed research activity to U.S. income, our whole domestic research effort continues at risk. A 50% allocation is very inadequate and further delay in resolution places U.S. companies at a competitive disadvantage in the world marketplace. Moreover, the treaty approach is not likely to be productive. Foreign governments are not likely to recognize deductions against income taxes for such research and development expenses incurred in the United States. U.S. companies faced with the prospect of losing a portion of the deduction allocated to foreign income are being enticed to move research and development activity out of the U.S. to countries to where they can deduct the full amount of such expenses against their foreign source income.

Therefore, The Council supports a full allocation of domestically performed R & D expense to U.S. source income on a permanent basis.

STATEMENT
on
MAKING THE R&D TAX CREDIT PERMANENT AT 25 PERCENT (S. 58)
and
ALLOCATION OF R&D COSTS TO FOREIGN SOURCE INCOME (S. 716)
for submission to the
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT
of the
SENATE COMMITTEE ON FINANCE
for the
U.S. CHAMBER OF COMMERCE
by
Robert Perlman*
April 3, 1987

The U.S. Chamber of Commerce supports prudent steps to promote research and development (R&D) efforts in the U.S. American productivity growth is lagging behind our foreign competitors. This trend is being caused in part by a decline in the level of U.S. R&D expenditures relative to other countries. We must not allow this trend to continue.

There is a vital need to encourage greater investment in R&D, which in turn will create more and better jobs and promote exports. Two provisions in our tax law should be changed to promote research. First, the R&D tax credit should be made permanent at a rate of 25 percent. Second, rather than implement Treasury Regulation Section 1.861-8, which discourages R&D in the U.S. by allocating a large portion of R&D costs incurred in the U.S. to the foreign source income of a corporation, all R&D expenditures made in the U.S. should be allocated to the U.S.

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*Director of Taxation and Customs, Intel Corporation

SUMMARY

R&D Tax Credit

There is evidence that the technological advantage enjoyed by the U.S. over our competitors is declining.

o As a percent of Gross National Product (GNP), U.S. R&D spending today is no greater than that of Japan and West Germany. Twenty-five years ago, U.S. spending on R&D as a percent of GNP was about double that of Japan and West Germany.

o Japan and West Germany have increased their spending on civilian R&D at a much faster pace than the U.S. since the mid-1960's.

Congress recognized the need to encourage U.S. R&D spending by enacting the 25 percent R&D tax credit in 1981. The 25 percent R&D credit has been a significant factor behind the increase in U.S. corporate R&D spending during the early 1980's.

o Companies that claimed the 25 percent R&D credit increased their 1984 R&D spending by an average of 48.3 percent over base period spending.

o Corporate spending on R&D produces benefits to society as a whole beyond the private rewards reaped by the companies involved in the R&D operation. The social rate of return to innovation is more than twice the private rate of return.

The Tax Reform Act of 1986 extended the credit for qualified R&D expenditures through 1988 at a reduced rate of 20 percent. The R&D credit expires on January 1, 1989. The nation's R&D shortfall cannot be cured in as short a period as five or eight years. R&D activity is long term. To maintain and increase economic growth, productivity, jobs, and competitiveness, high levels of R&D effort must be conducted for many years.

We believe that Congress should encourage long-term spending on R&D by making the R&D tax credit permanent at 25 percent.

Allocation of U.S. R&D to Foreign Source Income

Treasury Regulation Section 1.861-8 requires that substantial amounts of U.S.-incurred R&D expenditures be charged against foreign source income.

The allocation of those expenses to foreign source income without a corresponding foreign deduction leads to double taxation if a corporation is in a foreign tax credit limitation position. It is more probable that corporations will be in that situation given the lower rates under the 1986 Act. To the extent that a U.S. taxpayer conducts U.S. R&D, it causes a reduction in allowable foreign tax credits. Businessess can, however, often avoid this double taxation by moving their research operations outside of the U.S.

Such results conflict with sound tax and trade policy. Research in the U.S. should not cause double taxation. S. 716 would permanently solve this problem by allocating 100 percent of U.S.-incurred R&D expenses against U.S. source income. We urge that this bill be enacted promptly.

ANALYSIS

R&D Tax Credit

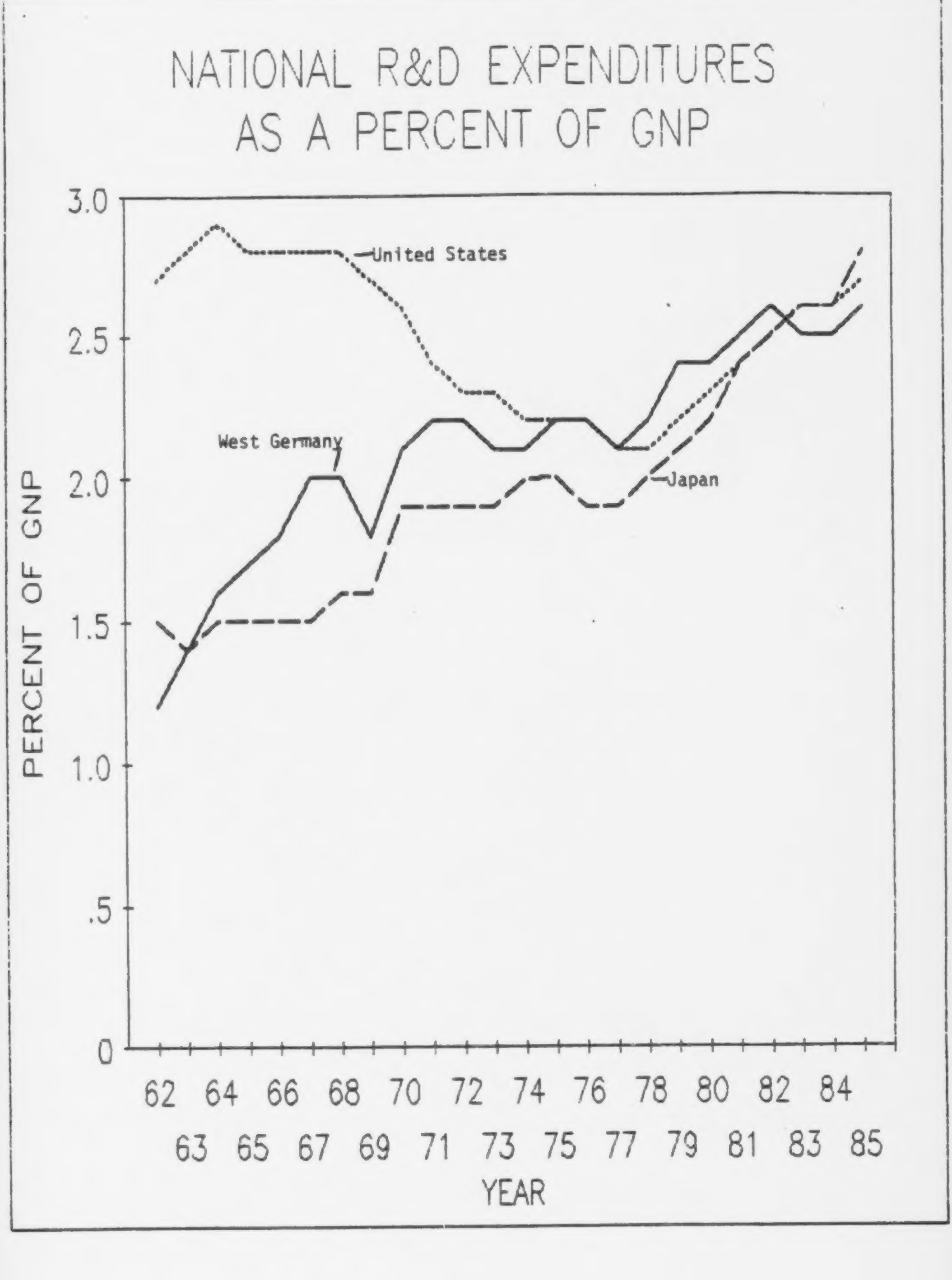
The U.S. is and continues to be the largest investor in the free world in terms of absolute size of expenditures. Nonetheless, several considerations show the U.S. effort in less favorable terms.

First, U.S. R&D expenditures are large relative to those of other countries because of the sheer size of the U.S. economy. Measured as a percent of Gross National Product (GNP), our R&D spending is no greater than that of Japan and West Germany, whereas until the late 1970's it was a significantly greater percent. (See Figure 1.)

Second, a high percentage of U.S. R&D expenditures is spent on defense technology. On the basis of its share of GNP devoted to nondefense R&D, the U.S. has annually trailed Japan and West Germany since the early 1970's. (See Figure 2.)

Third, U.S. technological leadership has been eroding. During the 1970's, the U.S. share of total R&D spending by the five largest R&D spending countries (U.S., Japan, West Germany, France, and the United Kingdom) declined from two-thirds to one-half. Recent data indicate a further erosion in the relative U.S. R&D position. For example, between 1978 and 1984, the share of R&D in U.S. GNP increased by 0.4 percent of GNP; by comparison, West Germany's R&D spending increased by 0.63 percent of GNP.

Figure 1


NATIONAL R&D EXPENDITURES
AS A PERCENT OF GNP
PERCENT OF GNP
3.0
2.5
2.0
1.5
1.0
.5
0
United States
West Germany
Japan
62
63
64
65
66
67
68
69
70
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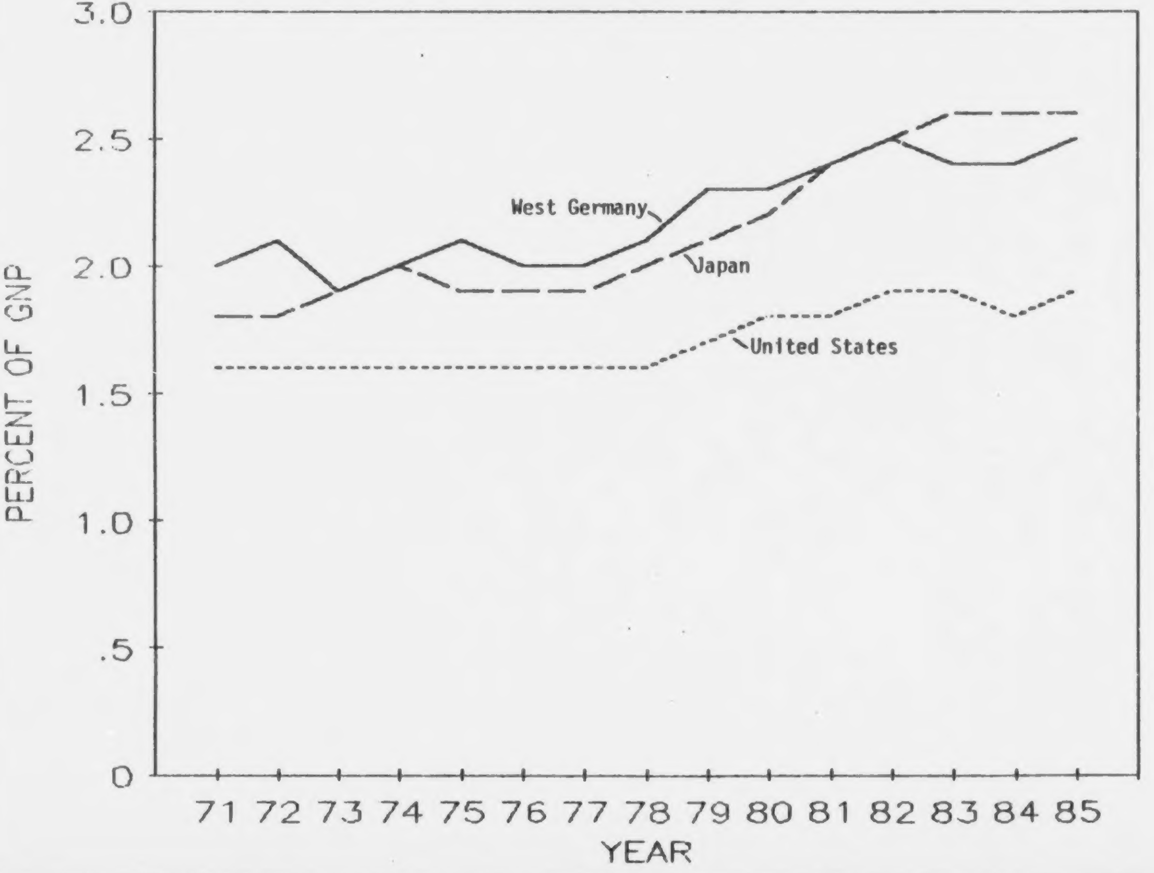


NON—DEFENSE R&D EXPENDITURES
AS A PERCENT OF GNP

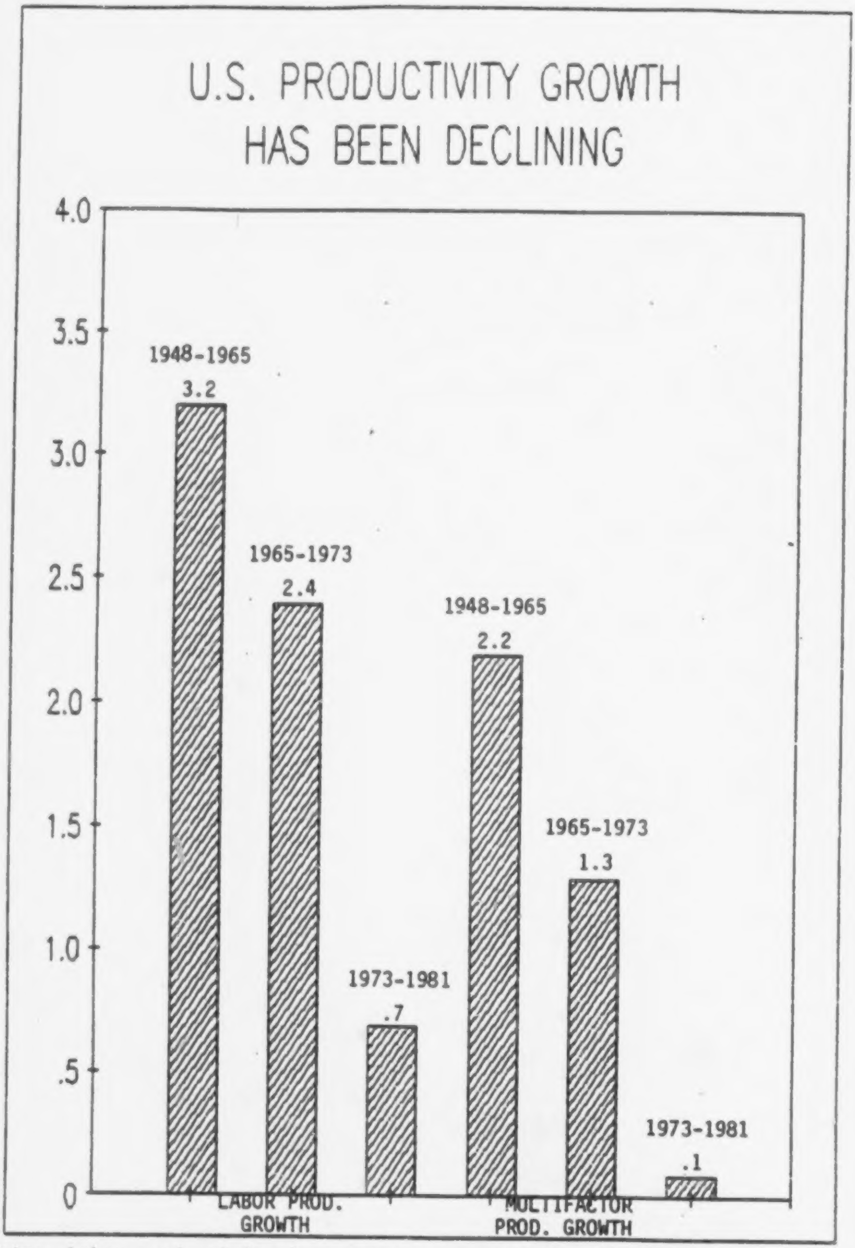
Industrial progress depends on the development of new and innovative products and methods. R&D conducted by U.S. businesses is the primary means by which innovation is generated. Scientific developments are transformed into new products and processes that result in increased productivity, improved living standards, and sustained economic growth.

The U.S. experienced a dramatic slowdown in its rate of productivity growth beginning in the mid-1960's, which became progressively worse from 1973 to 1981. (See Figure 3.) This laggard productivity growth was caused in part by a reduction in the pace of innovation. There is direct evidence supporting this view, particularly the idea that innovation slowed between 1973 and 1981. Based on statistics from the U.S. Patent Office, the number of patents issued to U.S. inventors fell from a high of over 50,000 per year from 1971-1973 to approximately 35,000 per year in the early 1980's.

The reduced innovation, indicated by both the reduction in productivity growth and in patents issued, can be linked to a decline in the growth of R&D spending that took place somewhat earlier. The growth rate of both total U.S. industrial R&D and company funded R&D was sharply lower from 1969-1978 than it was during the prior nine years. (See Figure 4.)

Although it is not possible precisely to identify the impact of R&D on productivity growth, there is a virtual consensus that rapidly growing R&D is a prerequisite of rapid productivity growth. John W. Kendrick, a recognized expert on productivity with the American Enterprise Institute, has emphasized that the slowdown in R&D spending was a major contributor to the decline of productivity growth from the mid-1960's through 1981.

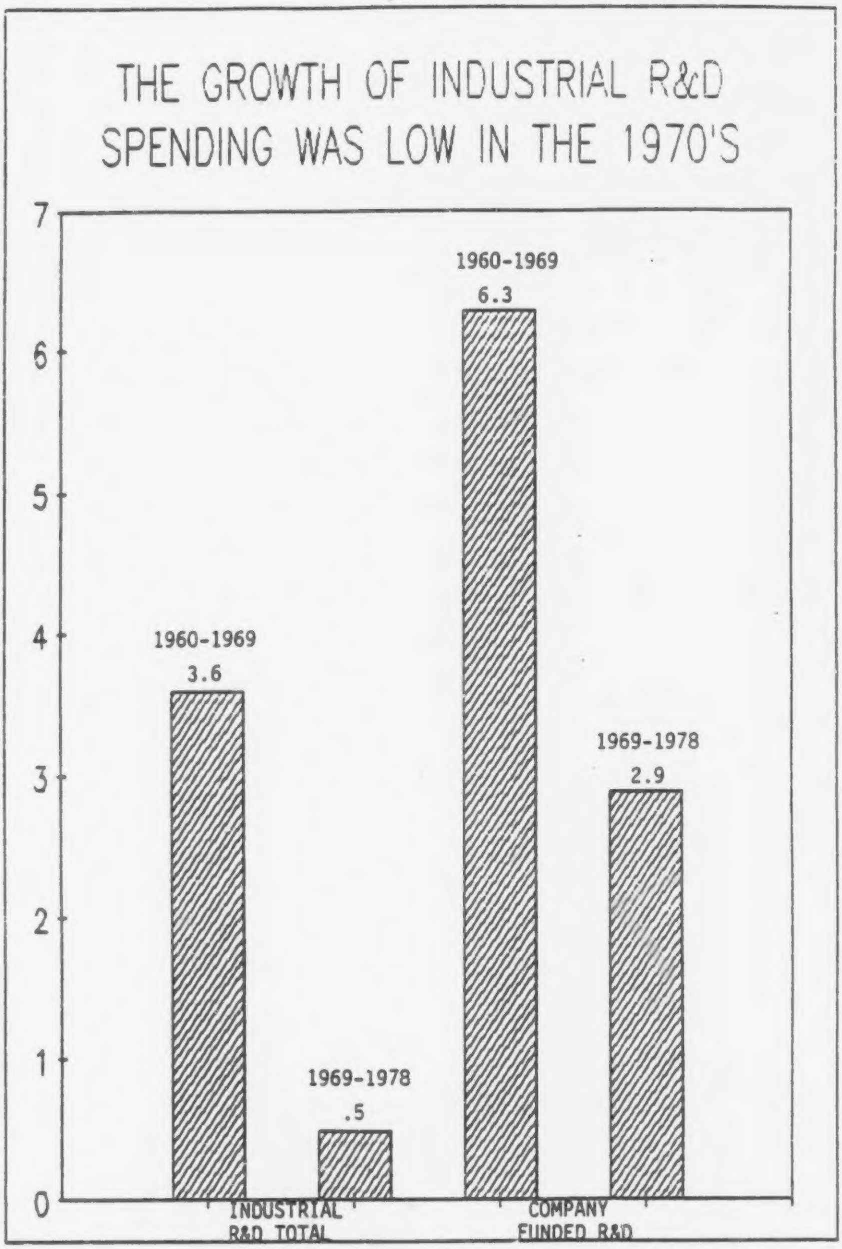
Figure 3



Note: Labor productivity is average output of the private business sector per hour worked. Multifactor productivity is average output per unit of combined capital and labor. Both are percent per year.

Source: Computed by the authors from data supplied by the Bureau of Labor Statistics, release USDL 84-431.

Figure 4



Note: Percent annual growth rates of expenditures on Industrial R&D in constant dollars

Source: National Science Board Science Indicators 1982, Washington 1983, p281

During the early 1980's, there was a resurgence in U.S. industrial R&D spending. From 1982-1984, R&D as a percentage of company sales averaged a little over 3.0 percent as compared to 2.3 percent in 1980. Similarly, R&D as a percentage of GNP averaged 1.75 percent during 1982-1984, compared to 1.6 percent in 1980.

The rise in U.S. R&D spending occurred even though the economy experienced a severe recession in 1982. This result is in sharp contrast to past recessionary periods, when R&D spending levels fell.

Congress recognized the need to restore the U.S. to its previous world economic posture by enacting the 25 percent R&D tax credit in 1981. The 25 percent R&D tax credit was a significant factor behind the increase in U.S. corporate R&D spending during the early 1980's. First, it demonstrated that even in a time of federal budget restraint there was a new commitment by the U.S. government to encourage improved innovation and productivity. In the area of R&D, we have been willing to be pound wise rather than penny foolish. Second, it provided an important financial incentive for companies to expand their R&D efforts in the U.S.

Based on data from 1984 tax returns, companies that claimed the 25 percent R&D credit increased their 1981 R&D expenses by an average of 48.3 percent over base period spending (i.e., the average amount of R&D spending in the previous three years). The strength of R&D spending in 1982, a deep recession year in which R&D budgets would normally be reduced, is significant evidence that the 25 percent R&D tax credit had a stimulative effect on private R&D efforts.

Observed values for total R&D spending are substantially greater in 1981-1984 than would have been predicted from projections based on current sales and R&D spending in the previous year. (See Table 1.)

Table 1

COMPARISON OF PROJECTED AND ACTUAL R&D SPENDING

1975-1984

Year	Projected R&D* Billion $	Actual R&D Billion $	Difference Percentage
1975	25.7	23.5	- 8.5
1976	28.0	26.2	- 6.4
1977	30.9	28.9	- 4.9
1978	34.2	32.1	- 6.1
1979	38.1	36.7	- 3.6
1980	41.9	42.7	+ 1.9
1981	45.9	49.9	+ 8.7
1982	48.4	56.8	+17.4
1983	51.3	64.4	+25.5
1984	55.1	69.9	+26.8

* Projection derived from the regression:

$$RD = 303.98 + .0065\ Sales + .778RD_{-1}.$$

These projections were conducted by Joseph J. Cordes and prepared for the National Association of Sciences.

Corporate R&D spending produces benefits to society as a whole beyond the private rewards reaped by the companies involved in the R&D operation. The excess social gains accrue both to consumers and to firms that compete with the companies conducting the R&D. Consumers benefit from lower prices on products as a result of cost-saving innovations. Competing firms are able to develop their own applications of innovative technology.

There is a substantial gap between the social and private rates of return for R&D and innovation. As a result, without an incentive such as the R&D tax credit, businesses will spend less in the U.S. on R&D than would be desirable from the perspective of society as a whole.

The most compelling study of social and private returns to innovation was conducted by Professor Edwin Mansfield and his associates at the University of Pennsylvania. This group contacted a large number of diverse businesses and obtained detailed cost and return information for a sample of 17 specific innovations. These innovations were a mixture of new products and new processes. Table 2 is drawn from the study and shows the rates of return that were estimated for the sample of innovations.

The conclusion of the study is that the social rate of return to innovation is very high. The median rate for the group was 56 percent. The median private rate of return was much lower--25 percent. Thus, the median social rate of return was more than twice the private rate of return.

Table 2

SOCIAL AND PRIVATE RATES OF RETURN FROM INVESTMENT IN SEVENTEEN INNOVATIONS

Innovation	Rate of return (percent)	
	Social	Private
Primary metals innovation	17	18
Machine tool innovation	83	35
Component for control system	29	7
Construction material	96	9
Drilling material	54	16
Drafting innovation	92	47
Paper innovation	82	42
Thread innovation	307	27
Door control innovation	27	37
New electronic innovation	Negative	Negative
Chemical product innovation	71	9
Chemical process innovation	32	25
Chemical process innovation	13	4
Major chemical process innovation	56[a]	31
Household cleaning device	209	214
Stain remover	116	4
Dishwashing liquid	45	46
Median	56	25

a. Based on investment of entire industry.

Source: Edwin Mansfield, John Rapoport, Anthony Romeo, Samuel Wagner and George Beardsley, "Social and Private Rates of Return from Industrial Innovation," Quarterly Journal of Economics, 1977, p. 223.

The 25 percent R&D tax credit has been successful in stimulating corporate spending on R&D operations since its enactment in 1981. Unfortunately, the 25 percent credit only applied for R&D expenditures through 1985. Although the Tax Reform Act of 1986 extended the R&D credit through 1988 at a 20 percent rate, the uncertainty surrounding the future of the provision caused less R&D investment to take place.

To maximize the benefits from the R&D tax credit for both businesses and society as a whole, the credit must be made permanent. The uncertainty surrounding the existence of the credit two or three years hence will lead to businesses reducing their commitment to long-term R&D projects and, in turn, reduce the social benefits from R&D spending to all Americans.

The social benefits from the R&D tax credit are analogous to an annuity, because the annual additional spending on R&D stimulated by the credit produces returns to society indefinitely. Both the returns and the total additional R&D that generates them compound over time as the R&D credit continues to stimulate new R&D each year.

Any measurement of single-year increases in R&D spending due to the credit not only fails to capture the social returns but also fails to capture a continuous process in which the social gains from a growing additional base of R&D investment are compounding over time.

In a 1985 study, Martin Neil Baily, Robert Z. Lawrence, and Data Resources, Inc. (DRI) concluded that if the 25 percent R&D tax credit were made permanent it would produce an increase in annual real GNP (in 1985 dollars) of up to $17.7 billion by 1991. The same study shows that when taking into account the increased tax revenue generated in future years by the increase in taxable income produced by the permanent 25 percent credit, the credit will raise federal revenues by up to $4.2 billion by 1991.

By reducing the cost of R&D in the U.S., the R&D credit shifts resources to U.S. based R&D activities and promotes long-term sustained economic growth. The actual increase in R&D spending depends on how businesses respond to a drop in the cost of conducting R&D.

In their analysis, Baily, Lawrence, and DRI estimated corporate response to the R&D credit by multiplying econometric estimates of the price elasticity of R&D by the estimated average value of the effective credit.

The price elasticity of R&D measures the percentage change in the amount of R&D for a given change in the cost of conducting it. For example, if the credit reduces the cost of conducting R&D by 4.0 percent, then a price elasticity of 1.0 would imply an increase in R&D of 4.0 percent. Similarly, a price elasticity of 0.5 would imply a net increase in R&D of 2.0 percent. The price elasticity for R&D spending was estimated to range from 0.3 to 1.0.

The average effective credit depends on a number of factors, including current and past R&D spending and tax liabilities and expectations about future R&D spending and profits. Baily, Lawrence, and DRI estimated that the average effective credit ranges from 3.0 to 4.0 percent. They concluded that up to a 4.0 percent annual increase in R&D spending as a result of a permanent 25 percent credit would result.

Our nation's R&D shortfall cannot be cured in a five- or eight-year period. R&D is inherently long range. In industries such as electronics, product cycles can last three to five years. Each cycle also builds on earlier cycles. In other high technology industries, such as aerospace, product cycles can last 10 to 15 years. In either case, high levels of R&D efforts must be performed every year. American industry is committed to undertaking the necessary efforts. But to enable this, we need sensible and stable policies.

Stability is needed so that industry can plan how its resources will be acquired and how and where they will be employed. This is particularly true with respect to R&D, the fruits of which can only be realized well beyond the time the R&D effort is undertaken. Aside from the proven effectiveness of the R&D credit resulting in increased R&D spending and productivity, one must ask how the industrial community can plan for the future without reasonable stability in tax policy relating to something as vital and fundamental to long-term economic growth as R&D.

The Tax Reform Act of 1986 extended the R&D tax credit through 1988 at a 20 percent rather than a 25 percent rate, as under prior law. The R&D tax credit will expire January 1, 1989. We urge Congress to make the R&D tax credit permanent at a rate of 25 percent, by enacting S. 58.

Allocation of U.S. R&D to Foreign Source Income

Because the foreign tax credit will be limited to 34 percent of a company's foreign source taxable income, there is a need to define the source of taxable income for that purpose. Sections 861, 862, and 863 of the Internal Revenue Code were created to define whether the source of income was within or without the U.S. Treasury Regulation Section 1.861-8 requires that indirect expenses be apportioned to the sources of income. Presumably, if this defining process is properly carried out, that which is U.S. source income will be taxed in the U.S., that which is foreign source income will be taxed in the foreign nation, and the U.S. tax on such foreign source income will be eligible for the relief provided by the foreign tax credit mechanism

The allocation of indirect expenses to foreign source income, without a corresponding foreign deduction, has the inherent effect of taxing the same earnings twice if a corporation runs up against its foreign tax credit limitation. Under the Tax Reform Act of 1986, it is more probable that multinational corporations will be in that situation. This result, of course, defeats the very purpose of the foreign tax credit, which is to prevent double taxation.

Double taxation results or can result, depending on the particular circumstances, because the U.S. expenses that are allocated under the Section 1.861-8 regulations to foreign source income are not deductible in the foreign jurisdiction because these are the expenses of a U.S. company, not a foreign affiliate. Other nations do not allow a deduction of indirect expenses incurred by another entity. Thus, a U.S. taxpayer in effect has its foreign tax credit limitation proportionately reduced to the extent it conducts U.S. R&D.

A U.S. taxpayer can minimize the penalty imposed by the Section 1.861-8 regulations by moving some of its R&D operations to other nations, so a deduction can be realized and no 1.861-8 allocation will be required.

An example demonstrating how Section 1.861-8 results in double taxation is shown in Table 3. The example also shows how the regulations result, in effect, in a denial of a deduction in either the U.S. or the foreign country for a portion of U.S.-incurred R&D costs and how this anomaly can be overcome by moving the R&D operations from the U.S.

The example assumes that a U.S. company maintains an operation in foreign Country X, through a foreign subsidiary. The operation in Country X is an exact duplicate of the U.S. operation. Country X's tax laws are identical to U.S. tax laws except that Country X does not have a provision equivalent to Section 1.861.8 and allows a full deduction for all R&D incurred in Country X. In the example, it is assumed that the U.S. requires a 35 percent allocation of U.S.-incurred R&D costs to foreign source income. The example also assumes that 100 percent of the income earned in Country X is repatriated.

Using the figures in the example, if the R&D expenses are incurred in the U.S., the effective combined foreign and U.S. tax rate is 40.6 percent, even though the rate in each country is 34 percent. If the R&D operation is conducted in Country X, rather than in the U.S., the effective combined tax rate is 34 percent, equal to the rates imposed in each country.

The regulations also presume that R&D conducted in the U.S. results in the generation of foreign source income, and completely ignore the fact that many products manufactured and sold abroad were designed and developed abroad. It makes no sense to require allocation of U.S. R&D expenses to income derived from sale of products abroad that were, in fact, designed abroad.

The solution is contained in S. 716, which provides that R&D expenses incurred in the U.S. are to be 100 percent allocated to U.S. source income.

TABLE 3

How Section 1.861-8 Regulations Can Result in Double Taxation

Assumed Facts:

1. Company operates in two countries, through subsidiaries, U.S.A. and Country X.

2. Factory, sales and support operations in the two countries are exact duplicates. There are no exports.

3. Country X's tax laws are the same as U.S. tax laws except that all R&D expenses incurred in Country X are allocable to Country X source income.

	Model #1 R&D Facility in U.S.A.		Model #2 R&D Facility in Country X	
	U.S.A.	Country X	U.S.A.	Country X
Sales	$1,000	$1,000	$1,000	$1,000
Total Cost, excluding R&D	650	650	650	650
R&D Costs	250	-	-	250
Total Costs	900	650	650	900
Income before Tax	100	$ 350	350	$ 100
Tax		$ 119		$ 34
Available for Distribution		$ 231		$ 66
Distribution	231	$ 231	66	$ 66
Gross-Up	119		34	
Taxable Income	$ 450		$ 450	
Tax-Tentative	$ 153		$ 153	
Tax Credit	89		34	
Tax	$ 64		$ 119	
Combined Tax		$183		$153

Combined tax rate of two countries

- 40.6% x $450 = combined tax of $183 - Model 1
- 34% x $450 = combined tax of $153 - Model 2

Computation on Tax Credit

Foreign Source Income		
Per Country X return	$350	$100
Less assumed §1.861-1 allocation	88	-0-
	$262	$100
Limitation - 34%	89	34
Foreign tax deemed paid	119	34
Loss of credit	$ 30	$-0-

Conclusion

The 25 percent R&D tax credit has generated an impressive increase in corporate R&D spending in the U.S. The social rate of return for innovation resulting from R&D is over twice the private rate of return for companies conducting the R&D. R&D expenditures incurred in the U.S. should be fully allocated to U.S. source income. This would eliminate the potential for double taxation and discourage U.S. companies from moving their R&D activities abroad.

The nation needs to conduct R&D over a long-term period to remain competitive. Our tax policy should encourage and reflect that long-term need. This can be achieved by making the R&D credit permanent at a 25 percent rate and by having 100 percent of U.S.-incurred R&D expenses allocated to U.S. source income. Early resolution of these issues is essential to the business community. Thus, we strongly urge that S. 58 and S. 716 be enacted promptly.

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